

CANADA

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REPORT

OF THE

Minister of Public Works

ON THE

WORKS UNDER HIS CONTROL

FOR THE FISCAL YEAR ENDED JUNE 30, 1900

SUBMITTED IN ACCORDANCE WITH THE PROVISIONS OF CHAPTER 36,  
SECTION 37 OF THE REVISED STATUTES OF CANADA

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OTTAWA

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1901



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*To His Excellency the Right Honourable Sir Gilbert John Elliot, Earl of Minto,  
G. C. M. G., &c., &c., &c., Governor General of Canada.*

MY LORD,

I have the honour to lay before your Excellency the Report of the Department of Public Works of Canada, for the fiscal year ended June 30, 1900.

I have the honour to be,

My Lord,

Your Excellency's most obedient servant,

J. ISRAEL TARTE,

*Minister of Public Works.*

OTTAWA, 18 January, 1901.



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PART I

REPORT

OF THE

Deputy Minister of Public Works

FOR THE YEAR ENDED

30th June, 1900





## DEPARTMENT OF PUBLIC WORKS

OTTAWA, DECEMBER 24th, 1900.

The Honourable J. ISRAEL TARTE,  
Minister of Public Works  
Ottawa.

SIR.—I have the honour to lay before you the report of the operations of the Department of Public Works during the fiscal year ended the 30th June last (1900).

This report contains the history of the work performed by the Department in the several branches under its control, which can be subdivided in three sections: 1o., the harbours and rivers, (including slides and booms, graving docks and dredging); 2. the public buildings and, 3. the telegraph service.

It also contains a detailed statement, prepared by the Accountant, Mr. A.G. Kingston, of the expenditure of the several appropriations placed at the disposal of the Department of Public Works by Parliament for the fiscal year under review, as well as a statement of the Collector of Revenue, Mr. E.T. Smith showing the income of the Department from its various sources.

The harbours and rivers branch is presided over by the Chief Engineer of the Department of Public Works, this position being now held by Mr. Eugène D. Lafleur, acting as Chief Engineer.

Its operations extend over a large field and cover the expenditure of a large amount of money, the sums voted under that head, for the fiscal year 1899-1900, having been \$3,091,987.50.

The public buildings are under the charge of Mr. David Ewart, the Chief Architect. The sum voted for the construction of new buildings, for the completion of those begun in past fiscal years, and for the maintenance of the existing structures, amounts to \$1,445,641.00.

The telegraph service is supervised by Mr. David H. Keeley.

This branch of the service is assuming large proportions, owing to the extension of the Government lines in various directions, and the total sum voted, for construction, operation and maintenance of telegraph lines, under the control of this Department, has, for the last fiscal year, amounted to \$527,400.00.

The revenue of the Department has been somewhat reduced during the fiscal year under review. It is mainly derived from dues received for the passage of timber through the various slides and booms constructed to facilitate the same, as well as from the use of the graving docks constructed at various points in Canada. Circumstances beyond the control of the Department, among which may be placed the practical cessation of the manufacturing of square timber in the Ottawa District, and a sudden flood in the River St. Maurice during the past year, which allowed a large quantity of logs to escape into the St. Lawrence for which no dues could be charged, answer in some degree for that reduction. As regards the graving docks, however, it may be remarked that, as their revenue is in direct ratio of accidents to shipping, it follows that if, on the one hand, less revenue is derived from that source in any one year, that decrease shows fewer casualties and a corresponding diminution of loss to the ship owners and other persons generally engaged in the shipping trade.

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A perusal of the report will show in detail the operations carried on by the branches of the Department above referred to, and it is needless to particularize here by giving the names of the places where work was performed, their geographical description nor the cost of the performance of such work.

This would perhaps be a tedious repetition, while I could not undertake to give as full information in this necessarily concise report as could be obtained by examination of the detailed statements of the operations of each of those branches.

I desire however to call your attention to the particularly successful attempt made by this Department of late years and especially for the period during which you have had control of its administration as Minister, in the direction of the improvement of means of transportation and lines of communication throughout the country. I may be permitted, I hope, when all attention is given throughout the world to the means of coupling facility and cheapness in transportation, to state and describe the share taken by the Department of Public Works of Canada in improving the resources of the country in that direction.

#### TRANSPORTATION.

Transportation, in the popular mind, associates more closely with the operations of railways and canals, although other works of paramount importance have to be performed in order that the exports and imports of the country be handled with despatch and cheapness, the two requisites in the race for business. It would therefore not be deemed amiss, before referring particularly to the work of the Department of Public Works, to say a few words about the railways and canals of this country, with whose work that of the Department of Public Works most is intimately connected, coming as a powerful adjunct to unite the links of those great arteries of communication separated by reaches of navigable waters.

The birth of railways in Canada goes back to the year 1835, when rails were laid between Laprairie and St. Johns, Quebec, the road being completed and opened in July 1836. The mileage then in operation was 16 miles, and it remained in that condition until the year 1847, when it was increased to 54 miles. Year by year, however, by the enterprise of the people of Canada, largely helped by the subsidies of the various Governments, this mileage increased rapidly until, in the year 1899 the number of miles of railway in operation amounted to 17,250, that of the tracks laid being 17,358, and that of the roads in course of construction 799 miles, or a gross total of 18,157 miles. The quantity of rolling stock on all those railways comprised, on the 30th June 1899, 70,855 carriages of various kinds, including engines, sleeping and palace cars, 1st, 2nd class, box, coal, tool cars, etc.

The total number of passengers carried was, during the year ended June 30th 1899, 19,133,315, and the number of tons of freight transported, 31,211,753, being subdivided in 16,081,934 barrels of flour, 163,881,948 bushels of grain, 3,850,572 head of cattle, etc., etc., etc.

Of the above railways, that having the greatest Canadian mileage under its control is the Canadian Pacific, operating 6,683 miles of track of which 4,590 are owned by the company and 2,093 are made up of leased lines. Next in order comes the Grand Trunk Railway system with a total of 3,162 miles, and the Canadian Government Railway system embracing 1,510 miles, while the balance of the 5,895 miles is divided between about 102 railways and their branches among which are the Manitoba and North Western, the Northern Pacific and Manitoba, the Canada Southern, the Canada Atlantic, the Ottawa Arnprior and Farry Sound, the Kingston and Pembroke, the Great Northern, the Québec Central, the Québec and Lake St. John, the Temiscouata, the Canada Eastern, and the Dominion Atlantic.

The greater part of those railways was constructed during the short period of 20 years which elapsed between 1874 and 1894, when the mileage which, in the

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first named year, was only 3,800 was increased at the latter period to 15,800 miles.

The total nominal capital paid up to the 30th June, 1899, amounts to the enormous figure of \$964,699,784, this sum including, besides the ordinary share capital, the preference bonds, bonded debt and sums granted by the Federal and Provincial Governments as well as by municipalities.

In the year 1898-9, the gross earnings of the Railways of Canada reached the total of \$62,243,784.65, while the net earnings were \$21,537,567.48.

The above figures show what a rapid and wonderful development railway facilities have acquired in a relatively short period, and speak volumes for the spirit of progress of the citizens of Canada, as well as the enlightened policy of Parliament and the Legislatures which, by their timely help and generous provisions, have made possible such an advancement.

In the construction of canals as means of transportation for industrial, agricultural and mining products, progress been made no less rapid nor less marked. The canals on the line of the main transportation route, between Lake Superior and the port of Montreal are the Sault Ste. Marie, the Welland, the Williamsburg Canals (the Galops, Rapide Plat and Farren's Point) the Cornwall, Soulanges & Lachine, a total length of artificial waterway of nearly 64 miles. The total difference of level overcome by the above named canals is 551 feet, and the number of locks utilised for that purpose is 47. The length of the locks 270 feet, their breadth 45 feet and depth of water on sills 14.0 is the same, with the exception of the lock at Sault Ste. Marie, the dimensions of which are as follows: length 900 feet, width 60 feet, depth of water on sill 20 feet 2 inches. The United States canals on the route to the seaboard are the Sault Ste. Marie, with a lock 800 feet long, 100 ft. wide and 20 ft. 2 inches on sills, and the Erie Canal having 72 locks 110 feet long, 18 feet wide with 7 feet of water on sills.

Besides the Canadian canals mentioned above, there are others constructed on other waters than the St. Lawrence, viz; the Carillon & Grenville canals on the Ottawa River, the Murray and Trent canals, the Rideau canal between Ottawa and Kingston, the Chambly canal, the St. Peter's canal between St. Peter's Bay and Bras d'Or Lakes, in Nova Scotia, the Beauharnois canal, which was used to overcome the Coteau, Cedars and Cascades rapids on the St. Lawrence River before the construction of the Soulanges canal, and the locks of St. Ours on the Richelieu, Yamaska on the Yamaska River, St. Anne's on the Ottawa River and Rivière du Lièvre on the river of that name, a few miles above Buckingham.

The first attempt at canalization work in this country was made in the past century when work was begun between Montreal and Lachine as well as between Lakes St. Louis and St. Francis and at Mille Roches. These canals were of small dimensions but were enlarged in 1804, and subsequently in 1807, when they were made 12 feet in width with a depth of 3½ feet. How far removed are we now from that crude attempt at artificial navigation with our huge Sault Ste. Marie canal, and its 900 feet lock, 60 feet in width and 30 feet in depth.

The need of improvement in canal communication was however soon felt, and the Lachine canal from its original depth of 2½ feet was carried in, 1825, to 5 feet, in 1874 to 12 feet, and is now 14 feet on the lock sills. The amount expended to the 30th June, 1899 upon this canal was \$10,787,094.

The Welland canal, the longest of the Canadian canals (23¼ miles) was begun in 1816, improved from 1823 to 1833 enlarged from 1842 to 1848, and in 1875 plans of the present canal, with 14 feet of water on the sills, were approved and the work since carried to completion. The cost of the canal to the 30th June 1899, was 23,771,636.

The improvement of the other canals followed apace, and the completion of the magnificent system was finally brought about by the opening to navigation, last summer, of the Soulanges canal 12.17 miles long, with four locks of the standard size of 270 by 45 feet.

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During the last season of navigation (year 1900), 19,699,128 bushels of grain passed through the Lachine canal, made up as follows :

Wheat .....	8,279,701
Corn .....	8,354,115
Peas .....	273,926
Oats .....	1,846,855
Barley .....	601,898
Rye .....	342,633

During the year 1899, the tonnage which passed through the Welland Canal reached the figure of 1,060,673 tons, and the St. Lawrence Canals 2,378,432 tons, compared with 1,140,077 and 1,439,134 tons respectively in 1898.

The total number of vessels which passed through the Canadian Canals for the same year was 29,590, aggregating a tonnage of 7,594,304 tons, transporting 213,711 passengers, and 6,225,924 tons of freight.

The movement of freight and the tonnage on the Welland Canal and the St. Lawrence Canals during the six months ended on the 30th June last (1900) was as follows : On the Welland Canal the total tonnage was 347,292, the freight transported aggregating 241,906 tons, and the number of passengers being 11,269. On the St. Lawrence Canals the movement of freight reached the figure of 259,185 tons, with a total tonnage of 640,886 and 12,278 passengers.

The total expenditure on Canadian Canals, including renewals and repairs, represents the large sum of \$92,036,524.

The revenue derived from these canals since Confederation amounts to \$12,079,274.

The above few facts show the vast expenditure made by a comparatively young country, representing a total investment in railways and canals, from all sources of \$1,056,736,308.

The largest portion, of the above works, was executed by the old Department of Public Works before its subdivision, by the Act 42, Victoria Chap. 7, in the year 1879. Since that year the present Department of Public Works has become specially charged with the improvement of the harbours and rivers and the construction of buildings and telegraphs, the enlargement of canals and the management of the Government railways remaining altogether with the new Department of Railways and Canals.

Concurrently with the encouragement of the construction of railways by grants and subsidies in land and money, and the construction of canals for the easier transportation of products of all kinds, the attention of the Government of the Provinces until 1867, and especially of the Federal Government, since Confederation to the present date, was given to the improvement of the various harbours, from the western lakes to the sea, not only in increasing their available depth by means of dredging, but in enlarging their shipping facilities by the construction of landing piers and of breakwaters for their protection against storms and deposits from either rivers or lakes, forming bars and shoals which rendered navigation very difficult.

This attention was given in a broad spirit of generosity and general usefulness, every part of the country being given the advantage of all the expenditure that could be made within the means at the disposal of the treasury. In the older provinces : from Fort William, on Lake Superior, to Montreal ; from Montreal to Quebec and through the St. Lawrence to the Gulf ; along the exposed shores of Nova Scotia, New Brunswick and Prince Edward Island ; piers and breakwaters were constructed, improved and enlarged until there are now over 325 works of various kinds under the care of the Department. As the other provinces joined in Confederation, their river and lake navigation, was improved : the navigation of the Fraser River, in British Columbia, on account of the peculiarity of its course and the nature of its shores, presenting a pro-

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blem difficult to solve, engaged the earnest attention of the Government as necessitating a large expenditure of money. For that purpose the Department has entered into a contract for the construction of a powerful sand dredge, 125 feet long, 32 feet wide and 7 feet deep, constructed to work to a depth of 40 feet, either by means of a long pontoon pipe, by a suspended discharge pipe or by the ordinary means of scows. This dredge is to be a self propeller and will have a speed of about 8 miles an hour.

Originally, however, the improvements in question were more or less of a local character, as the various harbours improved presented the only means of accommodation for the shipment of the produce raised in the section of the country of which they were the natural outlets, and for the introduction of those commodities of life not produced by the surrounding country. For that purpose, only ordinary depth of water was required and the general standard adopted was for a time sufficient for the needs of traffic and commerce. At some points, artificial harbours were created by the construction of parallel jetties and the deepening of water between them, and at others, protection works were built to direct and control the flow of rivers and prevent the discharge of sediment and detritus in harbours at time of flood.

The harbours of Port Arthur, Collingwood, Owen Sound, Meaford, Southampton, Port Elgin, Goderich, Port Stanley, Port Burwell, Cobourg, Port Hope, &c., were created and improved. Natural harbours, such as Toronto, Hamilton, &c., were rendered easier of access and protected by means of jetties constructed at their entrance : large sums in each case being expended.

The settlement of the north western states of the American Republic, that of the North West Territories, in our own country, and the accession of British Columbia to Confederation, increasing the cultivation and production of wheat and cereals, and augmenting the mining output, soon placed the Government of Canada face to face with the all-important problem of transportation. To the two great railways, the Grand Trunk and Canadian Pacific, reaching either directly or by leased lines to the ports of Collingwood, Goderich, Owen Sound and Fort William, soon were added, by the enterprise of that eminent Canadian, Mr. J. R. Booth, the Parry Sound and Canada Atlantic lines which, no sooner built and equipped, claimed their share of the transportation business, and constructed at their western and eastern terminals, Parry Sound and Coteau Landing, accommodation for their grain and lumber business. The giant strides made by the citizens of the United States, in the construction and equipment of their railways and improvement of their harbours ; their unstinted expenditure, both out of federal and local sources, for the improvement of their great shipping ports, New York, Boston, Portland, Philadelphia and Baltimore, and of their lake ports, especially Buffalo, soon opened the eyes of those immediately interested in Canadian transportation. The various boards of trade, the commercial bodies and the Federal Government took the matter into consideration and were urged to definite plans by the rapid action of their rivals, which threatened to irretrievably capture all transportation for many years to come and even deprive Canada of its own field of operations, the transportation of products grown on its own soil, the same being to a large degree transported in United States bottoms and on United States wheels, to the detriment of Canadian interests. Buffalo, with its sixty elevators, with its Erie Canal and network of railways centering at its gates, had no competing Canadian harbour on the lakes. The United States railroads, with their splendidly equipped terminals, were powers with which it appeared difficult to wage a successful rivalry.

The improvement of our own facilities within the quickest possible time by the expenditure of large sums of money, to put into effect the plans evolved by the skill and professional knowledge of our engineers, was the only course indicated to enable us to claim our rights and transact the volume of business per-

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taining to our situation and our almost unlimited agricultural and mining resources.

The first relief granted in that direction was the assumption by the Government, in 1889, of the large amount expended by the Commissioners of the port of Montreal, for the improvement of the river between Montreal and Quebec, which had reached a total of over \$3,000,000. Next came the question of providing a winter port in Canada after the close of the St. Lawrence navigation: immediately also had to be considered the formation on the great lakes at the head of our canal navigation, of a harbour giving the protection, as well as pier and elevator facilities for housing the vessels transporting cargoes, their loading, unloading, etc., prior to their entrance into the Welland Canal. The further improvement of the St. Lawrence between the port of Montreal and the sea was a matter also to be considered, as well as the improvement of elevator and wharf facilities in the harbor of Montreal.

The enlargement of our canals to a depth of 14 feet on the lock sills gave over the 7 foot navigation of the Erie Canal, an advantage which could not be utilized unless the facilities at either end of the canalized navigation rendered it possible of utilization to its highest degree. We could not on the other hand, leave such a great undertaking, representing such a large expenditure, without its being made to give all possible return for the sums expended.

While the truth of all this was becoming well recognized, and it was understood that the use of the canals was to be encouraged in every possible way, still other avenues of transportation were to be helped by the execution of works of improvement to admit of a large class of vessels and allow of the quick handling of cargoes. In pursuance of this policy, the large ports of Canada, although not on the main route of transportation, were equipped with much rapidity.

For the past seven years, a dredge operated by the Department has been stationed at Fort William, deepening the river Kaministiquia and creating basins for allowing the most easy access to vessels receiving their cargoes from the several large grain elevators constructed at that point by the Canadian Pacific Railway Company. This work is still being carried on at the present time, but the nature of the river is such that each season sand bars are formed at its mouth by the concurrent action of the large body of lake water and the rapid discharge of the river: the material in suspension being deposited in shallower water when it meets with the almost solid wall formed by the mass of water in the lake. To prevent this, expensive jetties would require to be constructed at the mouth of the river, but the plan, although studied at various times has not assumed a definite shape, owing mostly to the estimated large expenditure connected with this undertaking.

For the purpose, however, of increasing the duration of navigation, in the latter part of the fall of the year, a powerful tug has been engaged and put to work to prevent, if possible, the formation of ice or break it loose, if formed, on the shoals at the mouth of the river and leave the latter navigable for a longer period. It is hoped circumstances will permit of this experiment proving successful.

At Collingwood, an important contract was entered into two years ago by the Department for the dredging of that harbour to a depth of 20 feet, and it is expected that the work will be completed during the course of next season. At Goderich, after having taken steps to put in thorough repair the breakwater which had become dilapidated, the harbour itself has been improved by dredging, so as to give to vessels a depth of 20 feet. Works of very expensive and extended nature have also been and are being executed at the harbours of Owen Sound and Meaford, on Georgian Bay, while dredging of considerable importance has been done at Midland and Kingston.

Contracts are in course of execution for improving the entrances to the harbours of Hamilton and Toronto, and a portion of the dredging fleet of the De

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partment has been engaged in the improvement of minor harbours to encourage local trade or permit of extending already existing connections with United States ports.

Such is the case at Port Burwell and Port Stanley, where works of renovation and improvements have been going on for the past two or three years and are nearing completion.

It is also intended to improve the wharf facilities at Sault Ste. Marie, where existing conditions are almost revolutionized by the energy and spirit of enterprise of Mr. Clergue, whose great work in connection with the Algoma Central Railway is of a magnitude that excites wonder at the rapidity of execution, extent of interests involved and expected results.

The improvement of the Rainy River has also engaged the attention of the Department, and plans have been prepared and an initial sum of money voted for the purpose of rendering the navigation of that river easier.

Works of a very important and extended nature have also been planned to improve the navigation between Selkirk and Winnipeg, in the Province of Manitoba, by flooding what is called the St. Andrews Rapids. This is to be effected by the construction of a dam which will raise the water on the Red River 21 feet, so as to obliterate the rapids and afford continuous navigation at all stages of the water.

In connection with the dam, a lock is to be built 215 feet long, 45 feet wide, with nine feet of water on the sill. The dam above referred to is to be built of concrete and to be granite-faced.

Its length will be 800 feet with moveable sections of iron and a service bridge over the piers. This improvement has been urged, for quite a period, by the persons interested in the navigation of Red River, and it has become with the people of Winnipeg one of the most important of the questions to which they have, at various times, drawn the attention of the Government. The surveys, and the plans based upon the same, were made by Mr. Arthur St. Laurent, and a contract has been awarded for the performance of the work to Messrs. Kelly Brothers, of Winnipeg, who have made a commencement and are pushing the work with celerity.

In the Yukon District, much has been done by the Department for the improvement of navigation on the water route from Bennett to Dawson. Since the beginning of the year 1899, a party of Departmental engineers, under the direction of Mr. J. C. Taché, has been at work increasing the depth of water by the contraction of the river channel by the construction of wing dams, such as that at Caribou Crossing; straightening and directing the flow of water at the head of Lake Laberge; removing rocks and constructing guide piers at the Rink and Five Finger Rapids, and generally facilitating the journey and reducing the time employed in running between the several points. The same party is still employed continuing the improvements already begun and with the appropriation of further funds, it is hoped the needed work shall all be performed in an additional season.

In the province of Quebec and in the Maritime provinces, large expenditures have also been made by the Department to improve wharf and harbour facilities; in the Gulf, attention has been given to the wants of the fishermen by constructing breakwaters for the protection of their boats and improving their landing facilities.

This hurried reference to works in sections of the country, outside of the main transportation route, shows that the Government has been on the alert to supply all the wants of trade and commerce and that the high interests of great national value, although well looked after, have not prevented the necessary help and protection being given to industries and needs which, although apparently of smaller moment, assume for the section which they concern an importance which cannot be too highly considered.

As the best method of judging of the value and urgency of works of any kind is to look at their immediate results, let us see the nature of some of the

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improvements which have been rendered possible by the timely action of the Department.

At Collingwood, in addition to the 200,000 bushel elevator constructed in 1871 and rebuilt in 1890, it is intended to erect a second with a capacity of 1,000,000 bushels. It is also intended to build, in the almost immediate future, steel works of a capacity of 300 tons of finished product daily, and further to enlarge the present graving dock to a length of 445 ft., a breadth of 75 ft. and a depth of 16 feet on the sill. The export trade at this point has increased from a value of \$1,387,905 in 1897 to \$2,657,413 in 1900.

At Meaford the determination of the Department to construct new harbour works and to give a 20 ft. channel into the harbour has resulted in the construction of a grain elevator with a capacity of 700,000 bushels.

At Goderich the new elevator with a capacity of 500,000 bushels has handled during the past 2 years over two million bushels of grain, and the export trade has expanded from \$600,903 in 1897 to \$1,317,583 in 1900.

The advancement at Midland is none the less remarkable. There are now at this point two grain elevators owned respectively by the Midland Elevator Co. and the Grand Trunk Railway Co. They are respectively of 1,200,000 bus. and 413,000 bus. capacity and they have handled during the past two years the large quantity of nearly 21,500,000 bushels.

In addition to the grain elevators there have been built the Midland Smelting Works of a per diem capacity of 150 tons, having now on hand 10,000 tons of ore from the Helen Mine, Michipicoten, and 2,000 tons of magnetic ore from local mines. Four lumber mills are operated averaging an annual cut of 75,000,000 ft.

The three elevators at Kingston have during the last three years handled 35,000,000 bushels of grain, the largest quantity being that of the Montreal Transportation Co's., 26,000,000 bushels, the other elevators being those of the Kingston Elevator and Transit Co. and of Richardsons.

The dredging performed by the Department at Coteau Landing has enabled the Canada Atlantic Railway Co. to operate their grain transportation business with a facility which could not have existed but for our timely assistance. The statistics show that at Depot Harbour with an elevator of a capacity of 1,250,000 bushels, the Canada Atlantic R'y Co. has handled in 1899, 12,345,231 bushels and in 1900, 13,391,500 while at Coteau Landing the number of bushels handled by the Company was 10,985,276 in 1899 and 12,345,000 in 1900, the capacity of the elevator being 550,000 bushels.

Let us now revert to the steps taken for the improvement of navigation at the head of canal navigation and in the stretches of navigable waters, between the canalized sections and tide water at the Port of Quebec.

A reference to the distances over the principal transportation routes, from the head of the great lakes to Liverpool, shows very clearly the advantage to be gained by the use of the Canadian route, in point of time as soon as the same shall be made the most available by the creation of a suitable port at the head of canal navigation and the improvement of receiving facilities at the port of Montreal.

From Fort William to Liverpool by the United States route, comprising lake, river, canal and ocean navigation, the distance is 4,286.73 miles, while by the Canadian route the distance is only 3,834.54. From Duluth, the comparative distance is respectively 4,342.81 and 3,940.62; from Milwaukee, 4,250.92 and 3,798.73; and from Chicago 4,308.31 and 3,858.12, or in each case 452.19 miles shorter by the Canadian route than by the United States route.

The above figures are conclusive. They show more easily and clearly, than any long dissertation could establish it, the advantage to be gained by the selection of the Canadian route, should the security and facilities of the same be made equal to those of the other route.

With this end in view, and concurrent with canal improvement works at the



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entrance of the Welland Canal, the Department of Public Works has awarded a contract for the construction at Port Colborne of a breakwater 5,700 feet in length, extending from Sugar Loaf Point into deep water, the said breakwater having for its object the formation of a sheltered enclosure 438 acres in extent, with (after the necessary dredging shall have been performed) 20 feet of water at lowest stage, thereby permitting the largest vessels now operating on the lakes to seek the shelter of the Canadian shore and lie under the lee of this breakwater in perfect safety under any wind from any quarter. Inside of that protected area, the shipping will find, when the plans are carried into effect, the necessary pier and elevator accommodation for loading, unloading and transshipment.

From the moment it enters the canal at Port Colborne, to that at which it will reach the port of Montreal, at the foot of the Lachine canal, a vessel going through our St. Lawrence navigation, will find throughout all the distance the minimum depth obtaining in the canals, that is to say, 14 feet, and in order to leave no work undone, to give that necessary feeling of security to the shipping, a survey and examination has been ordered, and is being carried on in that part of the St. Lawrence extending from Kingston Harbour to the head of the Cornwall Canal. Furthermore, it can be added that throughout this line of navigation, good harbours of refuge can be found at convenient points which vessels can enter and where they can be in safety, when detained by stress of weather.

At the Port of Montreal, great improvements are also under way for the purpose of accommodating the large volume of increasing business which will come to this natural outlet of the national transportation route of Canada. Up to last year the wharfs, constructed by and under the superintendence of the Harbour Commission, have been of the type known as low level wharfs, that is to say, being under water during the winter and at the periods of floods in the spring, thus necessitating the removal of the storage sheds and other accommodation given to shipping during the season of navigation. The Commission has, however, with the approval of the Minister of Public Works, adopted the principle of high level piers and has commenced their construction, which is being carried on with great rapidity.

Montreal, as regards the improvement of its harbour, has stood, compared to the other public harbours of the Dominion, excepting Quebec and St. John, in a conspicuously unique position.

Up to the present year not one cent of public money has been expended on works of improvement in the harbour, the works executed being defrayed out of the revenues as regards the repairs and maintenance, and out of the proceeds of debentures, issued by the Commission and authorized by the Government, as regards the works of construction. As the works decided on by the Commission, and approved by the Government, are proceeded with, periodical statements are sent to this Department showing the extent and the value of the work done, and upon the deposit of debentures the amount required is advanced to the Commissioners upon the payment of interest and sinking fund, as regulated by the various Acts authorizing such advances. In that manner, the Harbour Commissioners of Montreal have executed their various improvements out of their own funds, and have necessarily been compelled to impose such wharfage and other rates as would bring sufficient revenue to enable them to meet the demands made upon them. It is true that they have received the cooperation of the city of Montreal, but such cooperation is only given as a proportion for the execution of works for the protection of the city against floods.

In 1887, a commission composed of the Chief Engineer of the Department of Public Works, the Chief Engineer of the Commission, the City Surveyor and Mr. T. C. Keefer, was appointed to report upon the means best adapted to protect the city against the disastrous floods which had for years previous afflicted it on the departure of the ice in the spring, and, at the same time, to suggest plans for

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the further improvement of the harbour. Several plans were laid before the Commission, but, in 1887, they finally decided upon a scheme designed to meet the dual requirement of flood protection and harbour improvement, such scheme being known as plan No. 6 and being formally approved of by the Federal Government. The present guard pier, extending from Victoria Bridge down stream, a distance of 7,150 feet, was one of the principal features of the plan. Dredging in the upper end of the harbour was also carried on with vigour, but while these works were carried on, it was soon found that further works of a different nature would require to be executed. The selection of suitable plans was the subject of prolonged discussion and continued careful research, not only on the part of the Commission but of the engineers of this Department: the relative merit and advisability of low and high level wharfs being one of the principal features of the controversy. Many were the interviews that took place with the Commission and the interested commercial bodies, and many were the plans suggested. Finally, in 1898, a plan which seemed to unite all contending opinions and which was known as plan No. 12 A 2, sanctioning the principle of high level wharfs, was adopted with the approval of the Privy Council, and work was begun in accordance therewith and is now vigorously carried on. This plan provides for the construction of three high level wharfs from 825 to 1,000 feet long, 300 ft. wide, with intervening basins 555 feet wide.

When completed all the possible accommodation shall have been provided in the upper section of the harbour.

The wharf improvement having been successfully disposed of, the question of elevator construction was the next which demanded consideration and was taken up in the most vigorous manner. To companies or corporations presenting proper guaranties, free location was offered by the Commission at a very convenient place at the Windmill Pt. Basin, in the upper part of the harbour, but this proposal, although of vital importance to the interests of Montreal, was also the subject of much difference of opinion and consequent delay.

As in the matter of plan 12a 2, the Minister of Public Works took, in this matter of elevators, an interest which was wide awake and which never flagged for one moment. Many interviews were had by him with the Commission, and both in his speeches and in the several articles he wrote on the question, he urged the necessity of coming to an early conclusion. The rapid advance of Buffalo with regard to improvement of harbour facilities and elevator equipment: the vast volume of trade diverted to other channels, although its proper route was through Canadian waters; the great advantages to be derived in the future by the country at large, and the many other aspects of a case as urgent as it was important were laid before the public by him on all possible occasions. He had made a careful and complete study of the conditions obtaining in other harbours enjoying the bulk of the western trade, and he proved conclusively that the advantages were ours if we were only on the alert and prepared for the emergency. Delay would be fatal.

The Harbour Commissioners became imbued with the same spirit, and a large deputation was sent early in 1899 to visit the principal ports of the United States, view their commercial facilities and equipment and evolve out of the information so gathered an acceptable and useful scheme.

The result of all these negotiations was the contract made with what is known as the Connors Syndicate. By the month of August next, this association of capitalists has undertaken, with the Commission, to construct one steel elevator with a capacity of 3,000,000 bushels, as well as storage warehouses for an additional 3,000,000.

With the execution of the works comprised in the plan known as 12a 2, the completion of the dredging and of the guard pier, the construction of these elevators will equip, as far as necessary, the section of the harbour it is intended to accommodate to the needs of trade and commerce. The difficult exit of the

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harbour, at what is known as St. Mary's current, being made easier by proper dredging will perfect the scheme.

This was not, however, deemed sufficient: such works as above referred to would possibly suit the present needs, but what about those of the almost immediate future?

There was no more room for new works and additional accommodation in the upper and central part of the harbour, but what were not the possibilities of what is called the eastern section, extending from below St. Mary's current down to Longue Pointe, and farther, if necessary? Here the question of considering Montreal as a national harbour was brought forward; the absence of any direct contribution by the state to its improvement was again made the subject of strong representations, and under the flood of light which former discussions and study had thrown upon the question of transportation and consequent necessity of further equipment, Parliament granted a sum of money sufficient to begin immediately the construction of important works in that section of the harbour. Plans were prepared after careful surveys, and in July last a contract was entered into with Messrs. Poupore & Malone for the construction of a high level wharf situate midway between the two level ones constructed some years ago by the Harbour Commissioners. This pier is to be built of concrete on timber cribwork foundation. It is to be 1,000 feet long on the upper or western face and 850 feet on the opposite face, and is to have a width on top (at coping level) of 270 feet.

Its top, when completed, will stand 23 feet above extreme low water level, and the depth along its face will be 30 feet at the same stage of water.

The contract also includes the construction of two bulkheads, respectively, 478 and 422 feet long of an even width of 150 feet including embankments up to the high level of 23 feet of the main wharf.

The work in question is however only the beginning of a much more comprehensive scheme which will be developed, as the needs of commerce require further extension.

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From Montreal eastward lie 140 miles of river navigation before reaching the tidal harbour of Quebec, forming what is commonly called the "Ship Channel" between Montreal and Quebec.

Ever since the year 1830, when the Harbour Commissioners were constituted for the management of the Harbour of Montreal, the deepening of that channel has had to keep pace with the increase in the size of ships consequent upon the enlargement of trade and commerce between European countries and Canada.

As can be seen by the following brief notes, the growth of the harbour and the improvement of the channel have gradually followed the demands of trade. In the harbour, up to 1825, there were only two small wharfs between what is now Custom House square and the foot of Lachine Canal, with about 1,120 ft. frontage and about two feet depth of water at the lowest stage. In 1825, the wharfing was extended and placed in about 5 feet of water. Between 1830 and 1832, several of the present wharfs were built of piles with from 5 to 20 feet of water in front of them, the aggregate frontage reaching 4,590 feet. From 1840 to 1846, that frontage was extended to 7,070 feet. With the exception of two new wharfs built in 10 feet of water, in the lower part of the harbour, nothing further was done till 1856.

Dredging operations had, however, been already commenced to deepen the river below the city and were by that time sufficiently advanced to allow vessels reaching Montreal with a draught of 13 feet at ordinary low water, instead of 11 feet as before, and it was then determined to continue the deepening of the ship channel which, in 1844, it had been decided to carry down to a depth of 16 feet.

From a depth of 16 feet, the enlargement was carried to 20 feet in 1867, then to 22 feet at the close of 1878, to 25 feet in October 1882, and ultimately to 27½ feet, and it is evident to the Department that this latter depth will not long be

sufficient for the enormous ships which are now built for the carrying trade, and which will require greater depth accommodation.

The deepening of the channel to 27½ feet has been proceeded with since 1883, and that depth can now be found, under normal conditions, when the water is at its ordinary stage.

In 1895, however, during the lowest stage of the water, in the month of October and November, it was found that the water had become so low that during a few weeks of those months, the normal depth of 27½ feet was not found at a few points, the water showing during the two last weeks of October and November an average depth of 26 feet 6 inches. There was also a small reduction in the depth of water in 1897, 1898 and 1899, but this time for a shorter period, i. e., only one week in October, when the depth was less than 27 feet. In the season just closed the water has maintained a fairly uniform level, the lowest depth observed in the channel having been 27.3 and that for only a short period, the observations since 1895 showing the following average :—

Year	May	June	July	Aug.	Sept.	Oct.	Nov.
1896	33.6	30.6	28.9	28.0	27.6	27.9	29.0
1897	33.6	32.6	30.3	29.3	28.0	27.0	27.6
1898	31.6	30.9	29.8	28.6	28.2	28.3	28.6
1899	36.0	31.9	30.3	28.6	27.6	28.0	27.9
1900	33.6	30.9	30.6	29.6	28.1	28.9	

These observations show that during nearly the whole of the season of navigation, that is to say, up to the beginning of October the depth of water is always in excess of the standard depth of 27½ and that during the years following 1896, the water level was practically at no period below the standard depth.

It must however be borne in mind that the assistance of the tide is given to navigation as far as Three Rivers and that when the depth of water is reported from Sorel or Montreal, or shown by the semaphores, advantage can be taken of the tide in exceptional years, such as 1895, in order to pass over the parts of the channel affected by it.

In the present state of the channel, as shown by the depths recorded, with proper care and proper handling of vessels by the person in charge, one may say that the navigation at 27½ feet is safe for any vessels not loading beyond that draught.

The extraordinary low water of 1895 will not, we hope, occur again, but as it was due to circumstances outside of the control of the Department, and as there might possibly be a recurrence of the same stage of water, the Department has taken steps to refer the depth of the channel to that extraordinary low water instead of, as originally, to the ordinary low level of the fall season, and for that purpose, since 1895, dredges of the department have been at work widening the sharp curves of the channel, deepening at points where the depth was not at the standard required and doing all possible to give the necessary security to the large ocean steamers navigating the St. Lawrence.

During the season of 1898 and since, each year, upon your orders, the channel has been tested and swept, from the month of June to the month of September, in a regular manner with a plant under the immediate charge of Mr. F. W. Cowie, an engineer of this department; a lookout being kept at the same time for any displacement of the bnoys marking the channel, and whenever obstructions were met, a dredge was immediately, upon the obstruction being found, put at work to remove the same.

The dredges under the control of the department, and operating in the ship channel during the year under review, were the "Laurier," the "Laval," the "Lady Aberdeen," the "Lady Minto" and dredges No. 8 and No. 11.

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These dredges have, during the season of 1899 and 1900 worked at the following points :

Ile Ste-Thérèse .....	width 450 feet depth, 29.0 length 0.3 M
Varennes to Cap St. Michel....	" " " " " " 3.0 "
Cap St. Michel to Ile Bellegarde	" 500 " " " " 1.4 "
Ile Bellegarde to Verchères....	" 450 " " " " 2.0 "
Ile au Bœuf.....	" " " " " " 0.3 "
Ile de Grace channel.....	" " " " " " 1.7 "
Stone Island.....	" 600 " " " " 0.5 "
Champlain & Pointe Citrouille..	" " 27 <sup>1</sup> / <sub>2</sub> " " " "
Cap Santé.....	" 500 " " " " 0.2 "
Ste. Croix.....	" " " " " " 0.3 "

Total length of dredging completed in 1899 and 1900.... 10.7 "

It may be here observed that the depth above given is reduced to extreme low water which is 2.40 feet lower than the old datum of the 27 <sup>1</sup>/<sub>2</sub> foot channel.

With reference to further details that may be required to give a more complete idea of the improvement of this channel during the past two years, I may be permitted to quote from a memorandum submitted by the Acting Chief Engineer, Mr. Lafleur, upon this point :

" Since the opening of the 27 <sup>1</sup>/<sub>2</sub> foot channel in 1888, almost the whole of the dredged portion of the river, except through Lake St. Peter, has been gone over. The bottom has been scraped and deepened, many curves and narrow places have been widened ; and in tide water below Cap Charles, shoals have been dredged to avoid the necessity of waiting for the tide.

" The low water of 1895 and 1897, and the increase in the size of vessels, called for a wider and deeper channel, and larger and more powerful dredges and plant were required.

" In 1899 the dredging plant in operation and under construction was in a position to warrant the commencement of a more extensive plan of operations.

" The new elevator dredges of large type, with their tugs and plant had proved their efficiency. Two powerful steel dredges, the result of long experience in design and practice with their tugs &c. were almost completed and two more, to complete the six required, were authorized. With the dredging fleet, repair shops &c., settled, and having in view the faults of the old channel, the type of vessels in use, and the urgency of work capable of immediate utility, the question of type of channel to give the best results was carefully considered."

" The old channel depth was 27 <sup>1</sup>/<sub>2</sub> ft. at low water of ordinary years, but it was possible this depth could not always be relied on, and future fluctuations of water level might even be worse."

" The lowest water on record in the 27 <sup>1</sup>/<sub>2</sub> foot channel was 25 feet 10 inches, on November 1st 1895. The level adopted for extreme low water was therefore assumed to be 10 inches lower, or at a river level that would give 25 feet in the old ship channel."

" As almost all accidents in the channel have been the result of vessels striking the edge of the bank, whether from pilots' negligence, defect in steering-gear or otherwise, it was decided to make the new channel as wide as could be dredged in one cut, and to straighten curves and lengthen tangents as much as economical considerations would permit."

" It was considered advisable to undertake the section from the limits of Montreal Harbour down the Batiscan, where the tide could be utilized ; a distance of less than 100 miles, on which distance there would be about 50 miles of dredging to be done."

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" In 1899 the new proposition was commenced. In general this proposition may be stated to be the making of a channel, from the limits of Montreal Harbour down to tide water, 400 to 500 feet wide and 29 feet deep at extreme low water, together with a possible anchorage basin in Lake St. Peter."

" During 1899 a commencement only was made, but during the present season with four new dredges working day and night, and two old dredges, a splendid result has been obtained."

" Of the estimated 50 miles of dredging more than 10 miles are already completed."

" The fifth new dredge is expected to be ready some time next year, and the 6th in 1902. With equal success, and operations conducted with the same vigour, it is expected that this proposition will be completed in 5 or at most 6 more seasons."

" In the mean time, although the shallowest place will govern the draught, the wider, straighter and deeper channel, will be safer and more easy of navigation."

" Any one cognizant of the recent difficulties of navigation of the old channel at Varennes, Verchères and Three Rivers, need only ask the pilots and navigating officers of ships in reference to the relief already given at these places during the last two years, both as to the safety and speed possible. As each locality is completed the same relief will be given until the full depth is ready for utilization."

" The present ship channel between Montreal and Quebec has a minimum width of 300 feet, with the bends, all, 450 feet and wider."

With reference to the length of time necessary to complete the further deepening of the channel in accordance with the policy outlined in the Acting Chief Engineer's memorandum, it must be borne in mind that the period in question is entirely in direct relation to the class of dredging machinery to be employed. If to the powerful six dredges which will, as above stated, comprise the fleet of the Department, a hydraulic dredge were to be added for work on Lake St. Peter, the deepening and widening of the channel in that sheet of water could be performed in much less time. These powerful machines, with a capacity of 2,000 cubic yards of dredging per hour, could remove with ease, during at most three seasons, the estimated 10,000,000 to 12,000,000 cubic yards of material required to be taken out to give a channel 400 feet wide and 29 feet deep, and could afterwards be utilized for dredging other parts of the St. Lawrence such as for instance the shoal opposite Ile aux Grues below Quebec. A type of such hydraulic dredge is now at work in the port of New York, U. S. That dredge is served by ten scows of a capacity of 2,500 cubic yards, each, of dredged material, and they have to be towed 20 miles to sea to the dumping ground. On a special test, one of those scows was filled in 40 minutes.

From the "Engineering" of 15th and 29th Dec. 1899, are taken the following extracts in reference to the enormous capacity of this style of dredge, which will show what progress is being made in this branch of river and harbour improvement work.

In order to more easily form an opinion concerning the relative value of the ordinary elevator and those hydraulic dredges one must bear in mind that the estimated work of one of the best type of our dredges, now employed on the St. Lawrence in about the same material would produce an average of probably 9,000 cubic yards per day:—

" The dredge Beta, is the pioneer of high-powered dredges, and was built by Mr. Linden W. Bates for the American Government. The output contracted for was 1,600 cubic yards, and her official tests reached the almost incredible record of 7,800 cubic yards an hour."

" It was immediately recognized by the engineering world that the "Beta" was the pioneer of a new order; that she brought to the work a power which

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" must revolutionize old systems : that improvements in waterways hitherto impracticable from magnitude and cost were made commercially possible.

" Among the first to avail themselves of the American experience were the Russians. They invited Mr. Bates, in the winter of 1897, to make a study of the Volga and report upon the applicability of his system to its needs. As a result the Government decided to apply his methods for some hundreds of miles of river.

" The Engineering Department of Russia therefore favoured an order for a duplicate of the " Beta ", the machine which had already given her record on the Mississippi."

" Trials of the Russian dredge—

" All parts of the dredge were subjected to searching trials prior to the departure of the plant for St. Petersburg.

" One set of tests for one half the dredge was conducted in a basin of about 40 acres at Drygoten, Belgium, on a testing ground provided by the Belgian Government ; the other was conducted at Steendorp on a bar of the river Scheldt, about 10 miles above Antwerp. Unofficial trial No. 1 at Drygoten was for the purpose of ascertaining the precision with which a given stratum could be taken, and it was found possible by raising and lowering the cutters to take a stratum of any required thickness, up to seven feet. The dredge advanced at a speed proportioned to the depth, fast for a shallow excavation, more slowly for a deep one. One test for an average cutting of 2 feet 4 inches resulted as follows :—

Distance run.....	1,200 feet
Time.....	76 minutes
Advance per minute.....	17.78 feet
Average cut.....	2.38 feet
Rate per hour.....	2,590 cubic yards.

" The material was fine compact sand and clay. This had been formerly farm land below the plane of cultivation : the cultivated surface had been previously removed for the construction of levees.

" Two weeks later the first official trial was made in a cut parallel to the former, with steam at high pressure and more pump revolutions, and a crew which had become familiar with the mechanism. In this trial the result was as follows :—

Distance run.....	1,000 feet
Time.....	37½ minutes
Advance per minute.....	28.8 feet
Average cut.....	2.44 feet
Rate per hour.....	4,524 cubic yards.

" The material in this cut was favourable, half of it being a loose sand, the other half a compacted sand and mixed clay.

" The trials of the other half of the dredge were conducted on a large bar at Steendorp, composed of very fine sand ; some cuts were along hard-packed material, others in material relatively loose. None of the material on the Scheldt is of so favourable a character as the coarse, looser sand met with in the cross-over bars of the Volga or Mississippi rivers. Preliminary to the official trial two prolonged tests were made at Steendorp to determinate methods of sounding and measurement. The first test showed :

An average rate of advance per minute.....	10.13 feet.
Average cut.....	5.66 "
Rate per hour.....	3,824 cubic yards.

" In another place the result was :

Advance per minute.....	9.09 feet.
Average cut.....	4.62 "
Rate per hour.....	2,803 cubic yards.

" It was observed that on account of the hardness of the face, the cutters were not powered sufficiently high to supply the full carrying capacity of the pumps. The second official test, conducted at Steendorp, resulted as follows :

Distance run.....	2,129 feet.
Time.....	180 minutes.
Advance per minute.....	11.83 feet.
Average cut.....	3.52 "
Rate per hour.....	2,860 cubic yards.

" The material was fine compact sand. All tests were conducted with 700 feet of discharge pipe. All measurements were in excavation, and to determine the capacity upwards of 5,500 soundings were taken. The Mississippi measurements were barge measurements, and to make comparison with the maximum capacity rate achieved by the Beta, it is necessary to double the official test No 1, 4,524 cubic yards (of the half dredger), and add 15 per cent, or 10,404 cubic yards, which is 30 per cent higher than any previous record. At the termination of the trials it was officially considered that each half of the dredge could be rated without exaggeration as having an hourly capacity of 2,700 cubic metres, about 5,500 cubic yards ; or a total capacity for the whole plant of 7,000 cubic yards per hour. It was also demonstrated that working on a cross-over bar, with a current velocity of 3 to 4 knots per hour, the dredge could be manœuvred with facility with but one line, (a head), thus doing away with half a dozen lines heretofore necessary for holding and manœuvring. As the machine is self-propelling and self-controlling in the current, the electric features manifestly have added enormously to the effective use of the dredge, and have minimised all possible interference with or from commerce."

The great capacity of that dredging machine shows how much more rapidly the work required to be done in the Lake St. Peter portion of the channel can be performed. The additional expense incurred would soon be recouped by increased rapidity in the performance of the work and the consequent earlier delivery to shipping of an enlarged channel. It is true that the expense connected with the purchase of one of those improved machines, may at first appear to be somewhat large, but when maintenance is considered, the comparative cost is greatly reduced and is not, as a matter of fact, higher, if as high, than the ordinary elevator dredge now used.

In connection with the necessary expenditure for the quick prosecution of this work, I may quote the remarks made in the report of 1898, which are still absolutely appropriate to the present moment :

" I do not think that I need make any lengthy reference to the necessity and urgency of carrying on the work on the St. Lawrence with as great rapidity as possible. The whole of Canada is interested in the performance of this work. Everybody recognizes that it must be thoroughly and quickly done, and I have no doubt that any efforts from the department, tending to procure better and more secure accommodation for the oceanic trade, would be met with hearty support by all who have at heart the advancement of the country. Already the grain carrying trade has looked to the Canadian route as an outlet for the transportation of the products of the Great West. Elevators are being constructed at various points on the route, and with the improvement of facilities in the Harbour of Montreal, the Canadian route should become the favorite, and should receive all the encouragement which it deserves."



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The above conclude the short review I have thought advisable to make of the works performed and intended to be performed, in order to permit of useful and successful competition by us in the transportation of products from the West. The creation of a protection harbour at the head of canal navigation; a canal system giving 14 feet of water; a national harbour at Montreal fully equipped with wharf and elevator accommodation; the channel to tide water at Quebec deepened at all stages of water; these will give a transportation route which will, with the difference of 452 miles in its favour, successfully compete with that passing through the United States, and will give that additional impetus to commercial enterprise which, alone, will make of Canada a great and rich country, and of Montreal in particular one of the most important shipping ports of Northern America.

Already the importance of our route for through shipment appears to have been recognized by our neighbours across the line, to such an extent that four United-States steamships, the "Monskaven," "Leafield," "Theano" and "Paliki," each of over 900 tons burthen have come, only a month ago, from Ohio U. S. through the Canadian canals on their way to the European ports of Bristol, Swansea, Newport and Cardiff respectively, and it is further announced that other ships of greater size are being built expressly for the transportation of the products of the West direct to Europe by way of Canadian canals, one having been launched at Chicago, on the 29th December, her length being 242 feet and her capacity 2,500 tons.

In addition to the all important question of transportation another subject is now occupying the minds of persons having an interest in the prolongation of the season of navigation on the St. Lawrence, I mean winter navigation. The question is not a new one, and occupied the attention of the Department and of the Harbour Commissioners as far back as November 1886, when an Order in Council was passed authorizing the expenditure of \$2,000 for fitting two powerful tugs for ice breaking purposes. No practical result appears to have been obtained as the attempt was not renewed.

The almost marvellous work of the Russian ice breaking steamer "Ermack" and its successful experience in the very thick ice of the Baltic Sea, has revived the interest in this question which has been brought more closely to the attention of the business men of Montreal by the conferences had with their representative bodies by Captain Inman, of Duluth.

Some details in reference to that remarkable ship and its work in the Baltic sea may not be out of place in this report and may be found of some interest:—

The "Ermack" was built in 1898 by W. G. Armstrong, Withworth & Company at Walker-on-Tyne for the government of Russia. She is a quadruple screw boat, three screws at stern and one at the bow. She has 48 water-tight compartments, 8 sets of engines, double ended return tube boiler and nickel steel propeller blades. At her trial on the 18th February 1899, she developed a speed of  $16\frac{1}{4}$  knots with 12,000 h. p. She was designed by Admiral Makaroff for the purpose of keeping open the northern ports of Russia during the winter season.

A report of her trial work in the ice is taken from the "Engineering" of the 31st March, 1899.

"Admiral Makaroff first met the ice in the Baltic. It was drift ice, apparently about 5 ft thick, and judging by the report of Mr. Cluston, of New-castle, who accompanied Admiral Makaroff on his voyage, there seems to have been not the slightest difficulty in getting the "Ermack" through this obstruction, as she went comparatively easy at 9 knots, the engines working slowly. Before going into the ice the vessel had been slowed down to 10 knots, so as to reserve the powers of the engine room staff for the harder work which was to come.

"The worst piece of ice which was encountered was estimated at 25 feet thick, and the ship went nearly through this formidable obstruction before she

" was brought up by it. Accurate measurements were taken, as far as possible, and the report reads that the field ice was 5 feet in thickness, the pack on the top was 9 feet and there was ice below the field amounting to 11 feet, so far as it could be measured, but may have been more as there was no means of measuring a greater distance below the bottom of the field. It was evident that a large mass of ice had been washed off a shoal place and had frozen on to the field.

" The worst field ice that they had much of was apparently 4 feet thick, with snow on the top of it. The snow seems to be the greatest impediment to the vessel's progress, as the designers of the ship had always been led to expect. Mr. Cluston reports that 12 in. of snow is a serious impediment and 18 in. almost blocks her; this is, of course, on the top of thick field ice. The ice generally in the Baltic appears to have been much more serious this winter than was expected, and it is said to be beyond 1883, which we gather was a record winter. The "Ermack" did not run continuously, but rested at night and started early in the morning, working with searchlight. There was apparently no difficulty in starting, although the ship had become fast in the ice. Ice anchors were put out and the vessel was warped backwards from her berth, after which she started apparently without difficulty. One of the most satisfactory features is that she steers, as Mr. Cluston says, "in any way, at any time, in any ice." This has never been the case with any ice-breakers that have previously been built, and is no doubt due to the form of the ship. As already stated, there is no flat place in her side, either vertically or horizontally, so that unless absolutely frozen in solid she can be given some movement, and can thus be worked loose by her own propellers and by ice-anchors laid out. Her arrival at Cronstadt was evidently an extraordinary sight. The ice was about 18 in. thick with a good deal of snow on the top, and the ship steamed through this at  $6\frac{1}{2}$  knots up to the sea wall and past the battle ships. She swung round on the port hand and entered the harbour through an entrance only 95 ft. wide; the ship, it will be remembered, is 71 ft beam. She swung once on the inside harbour and one charge astern put her into her berth along side the coal store. Some manœuvring trials were made in ice of about 2 ft. to 3 ft. in thickness, when the turning circle was found to be about 600 ft. and there was apparently very little difference in which direction the ship was turned. The effect of the bow propeller was most marked, and it seems practically to be that if the bow propeller be stopped, the ship stops too."

" Mr. Cluston examined the ship both inside and outside as far as he could, and could find absolutely no signs of weakness. The outer skin is polished bright where the vessel had been running through the ice, but there are no signs of leakage anywhere. The ice varied enormously in quality. Drift ice was passed through and appeared to offer practically no impediment. Pieces described as being quite 2 to 3 acres in extent were apparently pushed aside, the ship moving through quite easily. Pack ice with 18 in. of snow on the top appears to have been the greatest difficulty. Field ice of about 18 in. to 2 ft. seems to cause very little trouble, as the speed of 7 and 8 knots seems to have been comparatively easily maintained. In places such as that in which the very thick ice described as of 25 ft. in thickness was found, it consisting of very thick pack ice into which the ship had to charge, progress seems to have been not more than about 3 knots and sometimes even less. She arrived in Revel on Saturday afternoon having left Cronstadt on the previous Wednesday afternoon, so that she was three days on the journey. The ice was found to be 20 ft thick, and nine frozen in steamers were released. These vessels were conveyed out to sea by the "Ermack," and she was put about to bring into port others which were apparently lying outside the ice."

On a report lately submitted on the question to the Harbour Commission of Montreal, Mr. John Kennedy, their Chief Engineer, treats at length of the pos-

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sibility of successful work being done and considers it of importance that an effort be made in that direction. He instances the keeping open of the winter ferry at Quebec by the skillful use of steamers of moderate power at the proper time and place, and states his belief that the ice blockades can in like manner be prevented or if formed, be broken up before attaining great strength.

I take the liberty of quoting one of the most important parts of Mr. Kennedy's report :—

" It is well known that the Cap Rouge ice jam is the last point of obstruction to the clearing away of the ice above Quebec in spring, and navigation up to Montreal is sometimes seriously delayed by its holding on to a late date. The average date of the opening of navigation at Montreal by the river steamers, which winter above Cap Rouge is, for the last twenty-five years, April 19th, but the average date of the first arrivals from sea is retarded until April 30th. Allowing a day for ships to come from Quebec to Montreal leaves ten days' average delay in the opening of navigation from sea which may be fairly considered as caused by the holding on of the Cap Rouge ice jam."

" An ice-breaking boat of the power of the " Stanley " could by occasional work at proper times, easily eliminate this delay. By additional work she could keep open all winter the channel up to the lower end of Lake St. Peter ; and the same, or a more powerful boat, by more constant work and skill which would be gained by experience, would not only keep open the navigation channel through to Montreal, but, as was pointed out by the Montreal Flood Commission in 1887, it would, by breaking up the ice at proper places and times, prevent the formation of heavy ice jams, and thereby prevent the disastrous winter floods, of which they are the primary cause."

As the above had not yet been officially communicated to the Department, at the time of writing this report, it is not deemed advisable to express, at present, an opinion upon the feasibility of the proposed scheme. Suffice it to say that should any experiments, that may be made, have successful and promising results, even if the navigation only be lengthened instead of being opened throughout the winter, such an improvement would be another advantage to our Canadian Route and be an additional token of the success of Canada's efforts in the direction of transportation through its own natural channels.

These notes would hardly cover the required ground if a mention were not made of the works of improvement carried on at Sorel, Three Rivers, Quebec and St. John, N.B. the latter especially equipped for use as a winter port in connection with the Intercolonial and Canadian Pacific Railways.

At Sorel tenders have just been received for the construction of a pier of large dimensions with 16 ft. water at extreme low water upon which the Quebec Southern Railway propose to erect a large grain elevator, as well as storage sheds for general merchandise. This Quebec Southern Railway is to be operated in conjunction with the Rutland Railway which intends to inaugurate a through service from Sorel to Boston and New York. The Quebec Southern will be used from Sorel to Noyan, Que., then the " Inland Route " will be utilized through Lake Champlain to Burlington, Vt. the Rutland to Bellows Falls and the Fitchburg and Boston and Albany to Boston. Great expectations are based upon this new route which will open an additional outlet for Canadian products.

At Three Rivers, the Harbour Commissioners out of the proceeds of debentures, issued by them, are increasing their wharf accommodation by constructing a further length of wharfing to close the gap between the western end of their present wharf and that of the Richelieu and Ontario Navigation Company. When completed the wharfs under the control of this Commission shall have a total frontage of 2 000 feet with a minimum depth of 30 feet of water. Since 1897-98 the Harbour Commission has expended in wharf improvement the sum of \$80,000.00. The revenues of this harbour are growing steadily, under careful management, and the number of vessels seeking accommodation at this port is increasing year by

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year. That number which was 49 in 1897, and 43 in 1898 grew to 91 in 1899 and in the year 1900 the wharf accommodation was insufficient for the demand.

At Quebec great progress has also been made in the improvement of the harbour. I need not comment upon the great facilities offered by this unrivalled harbour, its great depth of water, excellent anchorage, the great accommodation given by Louise Docks and the relief to distressed shipping afforded by the commodious graving dock constructed on the Levis side of the river St. Lawrence. It may be proper to state here that this fine graving dock which had up to a year ago a length of 484 feet, has been enlarged so that its full length is now 600 feet, its width, 62 feet, remaining however the same. This work of lengthening the dock has just been completed.

During the past three years the Harbour Commissioners of Quebec have bent all their energies towards the gradual improvement of their already extensive wharf facilities. In 1898 the extension of what is called the Pointe-à-Carcy wharf was begun and was completed at the end of the present season (1900). The enlarged section of this wharf fronting on the St. Lawrence has a length of 350 feet, with a depth at low water of 50 feet, while the Custom House front has a length of 300 feet and a depth of 30 feet at low water.

In addition to this, 3,600 feet of railway track were laid on the wharfs, the breakwater was raised 3 feet as well as the South Quay wall of the dock; a coal wharf was built, as well as two freight sheds respectively 324 feet long by 38 feet wide, and 452 feet long by 80 feet wide. With the help of the Department, dredging was also performed for the foundation of the new extension as well as for the filling in, etc., the total expenditure during those three years for construction works having been \$252,426.03.

Mention should also be made of the construction, during the past season, by the Great Northern Railway, under the approved guarantee of the Harbour Commissioners, of a large grain elevator to accommodate the traffic of the railway. This large building, with a capacity of one million bushels, was constructed in a remarkably short time, and its service was inaugurated in the course of last autumn by the steamship "Albanian" of the Leyland line.

The number of vessels which arrived at the port of Quebec last season was 269, representing a total of 656,325 tons.

At St. John, N.B., the expenditure in the harbour has been jointly made by the city authorities and the Department, the greater part, however, having been borne by the city, the co-operation of the Department extending only to the operation of the dredge "Cape Breton".

For the last few years up to and including 1900, the total civic expenditure for the harbour improvements may be said to have been \$571,000 exclusive of the subsidies granted by the corporation to the Canadian Pacific Railway Company.

Broadly speaking, wharfs giving five deep water berths for ocean steamers together with the necessary warehouses, were provided by this expenditure.

This harbour was conferred upon the corporation by the Crown by charter dated 18th May 1785.

The revenue of the harbour for 1899, which may be taken as the present average, amounted to \$33,196, to which may be added \$4,000.00 rentals of fisheries.

The expenditure by the Department in dredging for the enlargement of the entrance, the deepening of berth at Sand Point and removal of shoal between deep water of the harbour and I. C. R. terminus long wharf, has amounted in 1899 and 1900 to the total of \$12,500.00.

During the same years a careful survey of the harbour was made by E. T. P. Shewen with a view to future improvement and deepening and the plans and report of said survey are nearly completed.

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The above does not naturally contain any reference to any part of the extensive work performed by the Department of Railways & Canals for the improvement of the I. C. R. terminus, details of which may be found in the report of that Department.

At the mouth of the harbour is Partridge Island on which is established the Government Quarantine Station. The increasing number of steamers, &c., making St. John their port of call, especially during the winter, after the close of navigation in the St. Lawrence, has necessitated the further improvement of the quarantine facilities, a work of much importance, the cost of which is defrayed by this Department.

## SURVEYS.

Quite an important part of the work of the Department consists in the preliminary surveys for the execution of works for which, afterwards, specifications and plans are prepared, thus permitting of contracts being awarded, or else of examinations being made after the execution of the works with a view to their proper maintenance to the required standard.

A number of those surveys have been executed during the past year, under the direction of the Chief Engineer, by his various assistants in Canada, but the most important to which I desire here to call attention are the survey of the French River and the hydraulic survey of the River St. Lawrence between Montreal and Quebec.

Representations have been made to the department to the effect that a very important addition to the transportation routes of this country would be made if French River, from Georgian Bay to Lake Nipissing were made navigable for large lake transportation craft. Quite a large proportion of the grain carried from north western Canada by the Canadian Pacific Ry., and stored in the elevators at Fort William, is delivered to whomsoever will transport it, beyond the small quantity that is carried by the steamers of the Canadian Pacific Ry., plying between Port William and Owen Sound. Owing to the physical condition of the route on the northern side of Lake Superior, the transportation of grain cannot be carried on with the necessary degree of cheapness, and the bulk of the Canadian Pacific Ry., transportation to Fort William evidently finds its way to Buffalo and thus to New York, the physical condition of the New York Central enabling that company to haul two or three times as many cars to a train as either the Grand Trunk or the Canadian Pacific could do over the greater part of the Georgian Bay lines.

It has been considered that the opening of a new route for grain transportation with its ultimate terminus at Montreal, and the additional advantages of permitting the further construction of elevators for the storage of grain for distribution during the winter months, would not in any way diminish the advantages or receipts of other Canadian transportation routes, as this new one would be principally fed out of what at the present goes through American channels.

Under those circumstances, the Minister has decided to examine the stretch of the French River between Georgian Bay and Lake Nipissing, a distance of about 50 miles, and a party of engineers has been despatched to make this examination.

Already a cursory survey has been made and enough information has been obtained to show that the scheme is a feasible one, and that in its execution no unsurmountable difficulty will be encountered. The survey now being carried on by the Department will more closely determine the technical features of the work and the estimated cost of its execution.

The second survey to which I have referred at the opening of this paragraph, is the hydraulic survey of the River St. Lawrence. This examination was begun by the Department in 1896, and is being carried on, at present, with a special

staff of engineers. The object of this survey is to ascertain and map out the exact depths that are now being found in the River St. Lawrence between Montreal and Pointe Platon, in order to establish not only the work which has been executed with a view of providing a 27½ foot channel throughout, but to determine the amount of work which may be required in some places to attain an increased depth of 30 feet and a possible increased width from the actual 300 feet. The operations of the survey have required most minute instrumental measurements and accurate soundings, the greater part of the latter having been taken during the winter season, when greater accuracy could be obtained, and the most dangerous portions more fully covered.

The survey has now reached Champlain, below Three Rivers and will be pushed with every degree of rapidity to completion.

When the charts of that survey are completed and delivered to the public, they will form a most valuable addition to the collection of charts of the River St. Lawrence and will certainly give the latest and most accurate description of the depth of water to be found not only in the improved channel, but in the whole section of the river.

#### TELEGRAPHIC COMMUNICATION.

The first telegraph system in Canada was established between Quebec and Toronto in 1847.

Now in 1900 there are 35,057 miles of lines of which 18,286 are in the hands of the Great North Western Telegraph Company, 8,886 are operated by the Canadian Pacific Railway Co., 2,912 by the Western Union Co., and 4,973 are controlled by the Government. This alone represents about 85,000 miles of wire and over 2,700 offices.

The Government lines may be subdivided into 4,711 miles of land lines and 262 miles of cables, the division into the several provinces being as follows:—

	Land Lines.	Cables.	Total.
Newfoundland .....	14 miles	.... miles.	14 miles.
Nova Scotia.....	230 "	26 "	256 "
New Brunswick.....	76 "	11 "	87 "
Quebec .....	1446 "	214 "	1660 "
Ontario .....	24 "	11 "	35 "
North-West Territories.....	698 "	.. . "	698 "
British Columbia.....	691 "	.... "	691 "
British and Yukon District.....	1533 "	.... "	1533 "

Grand Total.....4711 miles.      262 miles.      4973 miles.

With the exception of the Yukon telegraphs and the extension on the coast towards Belle-Ile, the lines included in the Canadian Government Telegraph Service were almost all established and equipped between the years 1880 and 1882, the length of the cables laid being in December 1882, 152 miles and that of land lines constructed, 2,566 miles.

The Government telegraph service was established in 1880, under the superintendence of the late F. N. Gisborne.

Simultaneously with the acquisition of the British Columbia lines, from the Western Union Telegraph Co., in 1880, the lines on the north shore of the St. Lawrence, from Murray Bay to the Gulf, those on Anticosti and Magdalen Islands, as well as the sections in Cape Breton, on Campo Bello and Grand Manan Islands, were constructed. At that period also were laid the cables between Anticosti Island and the Mainland of Gaspé and from Cape Breton to the Magdalen Islands.

This coast telegraph and cable service only become a *fait accompli* after long and careful study, extending over a period of five years. The first step towards its establishment was taken in 1876, when a committee of the House of Com-

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mons was appointed to examine into the best means of giving such telegraphic connection. It was, however, only in 1880 that the requisite sum of \$200,000 was granted. Foremost among the advocates of this useful work was the Hon. P. Fortin, then member for Gaspé, who had for a number of years been commandant of the fishery protection schooner "La Canadienne."

He strongly and urgently pressed the necessity of utilizing electric telegraphs for the purpose of signalling vessels navigating the St. Lawrence and for giving the required information at different points on the coast during the fishing season.

It must be said that the initial step in the construction of the St. Lawrence coast telegraph was due to his persistent initiative. At that date, however, the telegraph line was only constructed on the north of the St. Lawrence as far as Bersimis, but in subsequent years, further sums were granted until the system was extended as far as Pointe aux Esquimaux, about 500 miles from Murray Bay.

It was nevertheless soon understood that the telegraphic communication so afforded, at large expense, would not be complete and would not entirely fill the object had in view by its pioneers, were not the line extended so as to reach the first land generally seen by steamers coming from Europe and seeking entrance into Canadian waters. The necessity had been brought to the attention of the Minister of Public Works of the time by Hon. Mr. Fortin, in a letter which he wrote in November 1881, and the course which he advocated then has since fairly been followed, with the exception that he proposed the extension in question by means of sub-marine cables, crossing from point to point of the many bays, with which the north coast of the St. Lawrence is dotted, to Belle Isle.

At the direction of the present Minister, however and before any step was taken, a survey was ordered to be made in order to ascertain whether a land line could not be as expeditiously and as cheaply constructed, and the result was the decision of the Department to select a land line in preference to the laying of cables, the latter mode of communication being much more expensive, especially as regards its maintenance, and requiring for the repairs more skillful and expert labour than the repairing of land lines.

Three years ago, contracts were given for the supply of poles and for the construction of a portion of the 325 miles, forming the distance between Pointe aux Esquimaux and Baie du Chateau, it being from this latter point that the cable to the light-house at Belle Isle is to be laid. Year by year the line has been built, and it is now expected that by the middle of next summer the whole length shall be completed. The cable required to be laid between the mainland and Belle Isle has been purchased, but the unfortunate loss of our cable ship "Newfield" has prevented us from attempting to lay the same during last fall. The necessary preparations are however, made, and as soon as the required vessel shall be provided, this last length of most important telegraphic communication shall be laid. Practically, navigation between Europe and Canada will be reduced to 3 days, the oceanic distance being reckoned from land to land, and most passengers consider the oceanic passage at an end when they are able to receive news from the outside world and are again placed in instant communication with it. This will be effected when boats will be able to receive and send telegraphic despatches at Belle Isle, that is to say, 2 days before they are now able to be signalled after their entrance in the Gulf.

There is however one danger to be feared, in connection with the constancy of the telegraphic service, and this is the possible action of the icebergs upon the cable. It is well known that those enormous masses very often ground in very deep water, and it can be easily understood that their immense weight, when set again in motion, creates such a force that no human power is apparently able to resist it. The Minister will kindly remember that, in this connection, I have frequently recommended that an experiment be made with the system of wireless

telegraphy. It is now a well known and well established fact that communications, by that system, are sent and received over distances theoretically assumed to be as great as 80 miles. Whether, in practice, communication over that distance would be constantly successful, is a question perhaps not yet absolutely settled, but there is no doubt whatever, from the number of experiments which have been made, of the successful working of the apparatus for a distance of say from 30 to 40 miles. The distance across the Strait from Bay du Chateau to Belle Isle is only 22 miles, and I would therefore strongly advise that steps be taken at once to establish of a wireless telegraph station at Baie du Chateau, so that should ice—the Department will have the alternative use of the cable and the wireless telegraph bergs, etc., ever interfere with the working of the cable.

This very important part of the Department's work having been well put under way, it was not long before our attention was called to the necessity for telegraphic work at the very opposite extreme of the country. Since the discovery of gold in the Yukon "Eldorado," in the years 1895-96 and 1897, the rush of gold seekers from all parts of the old world as well as from the United States and Canada, rendered necessary the establishment, by the Government, of a branch of the administration at the capital of the Yukon District, for the purpose of administering justice and protecting in a proper manner the lives and property of the persons operating in those distant regions. In 1898, the Minister ordered the Chief Engineer of the Department to proceed to the Yukon, by what was then thought to be the most suitable and best way of reaching that district, that is to say, by way of the Stickeen River to Telegraph Creek, thence to the head of Teslin Lake and the Yukon River, to Dawson City.

The main object of the visit of the Chief Engineer, it may be stated, was in connection with the improvements that were required for navigation, but he was also instructed to look into the feasibility of the construction of telegraphs by the best and most available route. On his return, however, the Department found that the route most used and which would probably become that which all miners would follow, was that from Vancouver to Skaguay and from that point over the White Pass, to Lake Bennett, and following the River Yukon, to Dawson. The necessity for the construction of a telegraph line becoming more and more apparent, it was thought that one or the other of the companies having obtained charters for such purpose would undertake, without delay, the construction of the so much needed line. At last, when no move was being made and when, with the extraordinary increase in the number of persons going northward, necessity for quicker communication between the administration at Dawson and the central power at Ottawa became more imperative, the Minister of Public Works decided, with the sanction of Council, to undertake the construction of a telegraph line which would shorten the existing distance between Dawson and the eastern world by as many days as possible. Mr. J. B. Charleson, a trusted officer of this Department and one having acquired large experience when in the employment of the Government of Quebec, was selected by the Minister to conduct the operations, and he was instructed to give telegraphic communication between Skaguay and Dawson within the least possible time, the instructions issued to him naming the 15th November as the latest period at which the line should be completed. The country to be traversed was not, at that time, very well known. It is true that several of the surveyors of the Department of Interior had been in those northern regions, but the nature of the work they had to do was not such that they could supply the information required for the construction of a telegraph line, where every foot of the country had to be gone over and its particularities well known, both as regards the construction and the future maintenance of such a line.

On the 11th March 1899, the construction staff started on its journey, and on the 28th of the succeeding month, construction work was commenced at Bennett, the White Pass Railway having partially constructed its line to that point and having its telegraph line in operation, ready for the transfer of business from



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our own when completed. In the remarkably short period of six months, the 650 miles of telegraph line were completed, and on the 28th day of September, a telegram was sent by Mr. Charleson from Dawson, and was received in Ottawa four days after its having been despatched, thereby shortening the usual time taken for the receipt of news from that distant country by nearly 21 days.

It must be here explained that the four days were practically taken by the fast boat plying between Vancouver and Skaguay.

The rapidity in the construction was the cause of much favorable comment at the time and Major General A. W. Greely, chief of the United States Signal Corps, a very competent judge in such matters, expressed his surprise at the unprecedented short time in which the work in question was performed, and he has given the highest encomium to Mr. Charleson for the expeditious and most successful manner in which the work was so satisfactorily performed.

This construction, however, was only a link of what the Government considered necessary to unite the Yukon Country with the rest of the world. A four days navigation during summer, which increases to seven or eight days during winter, caused too long a delay for modern wants, and while the line from Bennett to Dawson was being constructed, Parliament was granting the necessary money to connect it over all Canadian territory with the northern terminus of the Government telegraph lines in British Columbia, at Quesnelle. The lines of the Canadian Pacific Railway Company's Telegraph are connected at Ashcroft with a section of the Government line running northwards, 225 miles, to the point above named, Quesnelle. From there, it was decided that further construction would be extended until it would reach a point on the newly built Yukon telegraph. Before returning from the construction of the Bennett-Dawson line, Mr. Charleson had been instructed to construct a further length southwards of 70 miles from Caribou Crossing to the town of Atlin, situate in the district of that name, in British Columbia, which was already becoming famed for the gold discoveries that had been made. The objective point to be reached from Quesnelle was therefore the town of Atlin, the distance being roughly estimated at 900 miles. The success which had met the efforts of Mr. Charleson the year before, being a guarantee that he would also be as fortunate in this further work, prompted the Minister to entrust him with the same, and at the beginning of 1900, he again started for the field of his labours.

Greater difficulties, both in transportation and construction, were to be met with on this new work. The shortness of the season of navigation of the rivers Stickeen and Skeena, by which part of the supplies were to be transported, and the high cost of freight which had to be sent by way of Ashcroft over land to Quesnelle, were matters which required quick decision in order that the enterprise might be successfully carried out. Work was commenced at both ends, namely:—from Atlin southwards, and from Quesnelle northwards, the line running by way of Hazelton, on the Skeena River, to Telegraph Creek, on the Stickeen, thence to Atlin.

At the end of the season Mr. Charleson was in a position to report the line nearly completed, with the exception of a gap estimated at between 30 and 40 miles from a point on the Chewelah river to another near the confluence of the Iskoot and Ningunsaw rivers. Pending full completion it is the intention of the Department to establish relays by means of dog trains during the month of January, 1901, the distance to be covered in one day and two nights, so that it will be possible to send messages from any point in Canada to Dawson and receive the answer therefrom in less than two days, while, on the other hand, we may state without fear of contradiction, that by the month of June or July, at the very latest, the line in question shall be absolutely completed.

The Department of Public Works has, therefore, during the past four years, undertaken and carried to successful completion the construction of nearly 2,000 miles of telegraph in, for the most part, unknown country under difficulties of all

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kinds, which the officers in charge have easily overcome, and where the construction, under adverse circumstances, has been successfully completed without any mishap.

I believe this work is one for which the department has earned a great meed of praise, the more so as it has been done without ostentation, in a very quiet manner, so much so that probably a large number of people are yet unacquainted with the work performed, its nature and difficulties and the great advantages to result from its execution.

While those great works of construction were going on, the maintenance of the existing lines and their renewal when necessary, were carried on with the means placed at the disposal of the Department, and through its carefulness, the most remote parts of the country, where the probable volume of business could not warrant any profitable compensation in undertaking the required work, were brought into close contact with the balance of the business and commercial world at large.

The Department cannot of course look to any adequate pecuniary return for the sums expended. It had to do the work in the interest of the country and, as I have just stated, in sections where no commensurate return for the expenditure could be hoped for. The line from Bennet to Dawson, however has been a happy exception to the general rule, and the returns show that a very large proportion of the receipts has gone into the Treasury in excess of the expenditure required for maintenance.

I will here close the reference I have thought advisable to make to the work of this Department, both as regards transportation routes and lines of electric communication.

I hope, nevertheless, that incomplete as they may be, they will serve to show the great work completed in a relatively short period. These various undertakings, performed under the active and inspiring direction of the Minister, could not, however, have been satisfactorily carried to a successful issue but for the hearty cooperation of the several officers of the Department, each one in his particular sphere helping towards the success of the general work. I believe that there is great cause for congratulation, and I cannot give too much praise to the chief officials who had immediate charge of those works and their assistants for the active support which they have given me in carrying out the orders given by the Minister.

A cursory statement of the business performed will show the extraordinary increase of the Department during the past few years. For instance, in 1891, when I became Deputy Minister, the amount placed at the disposal of the Department for expenditure, was \$3,260,000.00 while for the year 1900-1901, this amount has reached the figure of \$6,200,000.00, that is to say nearly twice as much.

In the year 1891, the number of payment cheques issued by the Department was 5,600, while in the year 1899 that number was 14,540, and in 1900, 24,620, a most extraordinary increase. The number of different works alone under the charge of the Chief Engineer was, during the last fiscal year, over 800, while the Chief Architect had to see to the maintenance of nearly 250 buildings and prepare plans and specifications for the construction of from 10 to 15 new ones including two important buildings at Dawson City, the post office and Court House, the former being occupied during the last days of December. This shows a great increase in the work of the Department, while on the other hand, the accounts show that this work is performed with a staff very little larger than it was 10 years ago and with an expenditure so small comparatively as to appear out of all proportion with the amount of work executed.

I have the honour to be, Sir,

Your obedient servant,

A. GOBEL,

*Deputy Minister.*

PART II.

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STATEMENTS OF EXPENDITURE

DURING

FISCAL YEAR ENDED JUNE 30, 1900.



## PART II.—1899-1900

STATEMENT A.—Showing the Amounts Expended by the Department of Public Works of Canada, during the fiscal year ended June 30, 1900.

Name of Work.	Construc- tion and Improvements.	Repairs and Furniture	Staff and Main- tenance.	Total.
PUBLIC BUILDINGS	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<i>Nova Scotia.</i>				
Amherst post office .....		23 82		23 82
Annapolis " .....		402 17		402 17
Antigonish " .....		159 60		159 60
Arichat " .....		3 00		3 00
Baddeck " .....		108 38		108 38
Dartmouth " .....		20 50		20 50
Digby P.O. custom house, etc .....	3,120 16			3,120 16
Halifax Appraisers' office .....		151 56		151 56
" Assistant Receiver-General's office .....		14 45		14 45
" Dominion Building .....		1,265 47	52 77	1,318 24
" Drill Hall .....	14,839 82			14,839 82
" Immigration building .....		560 21		560 21
" New Public Building .....	24,048 52			24,048 52
" Quarantine Station on Lawlor's Island .....	7,608 50			7,608 50
Kentville post office .....	10,478 80			10,478 80
Liverpool " etc .....	12,011 58			12,011 58
Lunenburg " etc .....	34 29	68 06		102 35
Nappan Experimental Farm .....	307 63	168 86		476 49
New Glasgow post office .....		26 00		26 00
North Sydney " .....		338 34		338 34
Pictou custom house .....		39 80		39 80
Pictou post office .....		54 30		54 30
Sydney " .....	210 00	60 02		270 02
Truro " .....	1,822 44	305 21		2,127 65
Windsor drill hall .....	1,386 99			1,386 99
" post office .....	3,459 02	12 00		3,471 02
Yarmouth post office .....		200 50		200 50
Heating, lighting, water, etc., for all buildings in Nova Scotia (for details, see page 23) .....			19,706 70	19,706 70
Totals for Nova Scotia .....	79,327 75	3,961 34	19,759 47	103,078 56
<i>Prince Edward Island.</i>				
Charlottetown Dominion building .....		1,761 51		1,761 51
" Queen's square ground, 1897-98 .....			500 00	500 00
Montague post office .....		18 18		18 18
Summerside post office .....		46 83		46 83
Heating, lighting, water, etc., for all buildings in Prince Edward Island (for details, see page 23) .....			4,524 26	4,524 26
Totals for Prince Edward Island .....		1,826 52	5,024 26	6,850 78

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PART II.—STATEMENT A.—EXPENDITURE—*Continued.*

Name of Work.	Construc- tion and Improvements.	Repairs and Furniture	Staff and Main- tenance.	Total.
<b>PUBLIC BUILDINGS—Continued.</b>	<b>\$ cts.</b>	<b>\$ cts.</b>	<b>\$ cts.</b>	<b>\$ cts.</b>
<i>New Brunswick.</i>				
Bathurst post office .....	295 00	84 40		379 40
Carleton, St. John, post office .....		61 61		61 61
Chatham new bonded warehouse .....	1 60			1 60
" post office .....		31 16		31 16
Dalhousie .....		1,318 00		1,318 00
Fredericton " etc. ....		166 17		166 17
Marysville .....	53 80			53 80
Moncton .....		51 83		51 83
Newcastle .....		13 50		13 50
Portland (St. John) post office .....		33 60		33 60
St. John custom house .....		2,396 03		2,396 03
" post office .....		1,391 09		1,391 09
" Quarantine station, improvement .....	19,593 43			19,593 43
" Savings' Bank .....		3 25		3 25
Tracadie Lazaretto (out building) .....	1,237 11	298 55		1,535 66
St. Stephen's post office, etc. ....		111 98		111 98
Sussex .....	1,813 25	104 10		1,917 35
Woodstock .....		63 40		63 40
Heating, lighting, water, etc., for all buildings in New Brunswick (for details, see page 23) .....			20,659 03	20,659 03
Totals, New Brunswick .....	22,994 19	6,128 67	20,659 03	49,781 89
<i>Quebec.</i>				
Aylmer post office .....		782 07		782 07
Berthierville post office .....		400 96		400 96
Buckingham Public Building .....	80 00			80 00
Coaticook post office .....		64 40		64 40
Dundee custom house .....		4 00		4 00
Drummondville post office, etc. ....		45 00		45 00
Farnham post office .....	350 00	77 52		427 52
Grosse Isle Quarantine station .....	12,801 72	2,992 55		15,794 27
Hull post office .....	1,184 87	48 95		1,233 82
Joliette post office .....		176 48		176 48
Lachine .....		627 31		627 31
Laprairie .....		71 45		71 45
Montreal custom house .....		2,488 48		2,488 48
" examining warehouse .....	74 00	2,094 86		2,168 86
" exam. warehouse, power for elevator .....			91 21	91 21
" inland revenue office .....		862 01		862 01
" post office .....		19,546 00		19,546 00
" power for elevator .....			3,044 59	3,044 59
" assistant receiver general's office .....		325 00		325 00
" Lachine Canal custom house .....		99 30		99 30
" St. Henri post office .....		589 54		589 54
" St. Lawrence street post office .....		11 25		11 25
" generally .....		247 36		247 36
Quebec brigade office .....		82 20		82 20
" citadel, Governor-General's quarters .....		5,781 29		5,781 29
" clerk of works office .....		77 50		77 50
" cullers' office .....		236 47		236 47
" examining warehouse .....		1,856 08		1,856 08
" custom house .....		3,047 44		3,047 44
Carried forward .....	14,490 59	42,635 56	3,135 80	60,261 95

PART II.—STATEMENT A.—EXPENDITURE—*Continued.*

Name of Work.	Construc- tion and Improvements.	Repairs and Furniture	Staff and Main- tenance.	Total.
PUBLIC BUILDINGS— <i>Continued.</i>	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Brought forward.....	14,490 59	42,635 56	3,135 80	60,266 95
<i>Quebec—Continued.</i>				
Quebec Dominion public buildings.....		10 61		10 61
" immigrant building, Louise embankment.....		1,913 87		1,913 87
" observatory.....		624 46		624 46
" post office.....		8,055 99	52 64	8,108 63
" Queen's wharf building.....		2,787 38		2,787 38
Richmond.....		443 26		443 26
Rimouski.....		17 00		17 00
Rivière du Loup (Fraserville) post office.....		96 40		281 40
Sherbrooke post office.....		562 54		1,392 54
Sorel.....	185 00	814 00		814 00
St. Hyacinthe.....	830 00	233 04		233 04
St. Jérôme.....		74 36		74 36
St. John's.....		66 58		66 58
St. Lin.....		203 00		203 00
St. Roch post office.....		32 25		32 25
St. Thomas de Montmagny post office.....		111 30		111 30
Three Rivers custom house.....		108 38		108 38
" dairy exhibit building.....	873 63			873 63
" post office.....		1,134 49		1,134 49
Valleyfield.....		3 80		3 80
Victoriaville public building.....	3,908 25			3,908 25
Heating, lighting, water, &c. for all buildings in Quebec (for details see page 24).....			46,443 06	46,443 06
Totals, Quebec.....	20,287 47	59,928 27	49,631 50	129,847 24
<i>Ontario.</i>				
Alexandria Reformatory.....	1,233 65			1,233 65
Almonte post office.....		8 75		8 75
Amherstburg custom house.....		6 00		6 00
" post office.....	1,038 08	147 45		1,185 53
Aruprior.....	3,450 10	149 79		3,599 89
Barrie.....		2 50		2 50
Berlin.....		630 49		630 49
Belleville.....		332 76		332 76
Brampton.....		67 10		67 10
Brantford.....		316 88		316 88
Brockville.....		107 85		107 85
" drill hall.....	290 43			290 43
Carleton Place post office.....		6 75		6 75
Cayuga.....		94 80		94 80
Chatham.....		1,587 30		1,587 30
Cornwall.....		111 25		111 25
Dundas.....		20 50		20 50
Galt.....		566 15		566 15
Gananoque.....		76 04		76 04
Goderich.....		35 30		35 30
Guelph.....		145 06		145 06
Hamilton.....	1,151 00	772 20		1,923 20
Ingersoll.....	10,081 41			10,081 41
Kingston custom house.....		677 54		677 54
Carried forward.....	17,244 07	5,862 46		23,106 53

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PART II.—STATEMENT A.—EXPENDITURE.—*Continued*

Name of Work.	Construction and Improvements.	Repairs and Furniture	Staff and Maintenance.	Total.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<b>PUBLIC BUILDINGS—Continued.</b>				
Brought forward.....	17,244 07	5,862 46		23,106 53
<i>Ontario—Continued.</i>				
Kingston drill hall.....	39,975 27			39,975 27
" graving dock office.....		178 45		178 45
" post office.....		790 37		790 37
Lindsay ".....		73 40		73 40
London drill hall and armoury site.....	5,010 45			5,010 45
" post office.....	4,000 00	1,437 05		5,437 05
" custom house.....		2,547 53		2,547 53
Milbrook Ry St. post office.....		1 00		1 00
Napanee post office.....		100 75		100 75
Newmarket ".....		9 25		9 25
Niagara Falls ".....		54 00		54 00
Orangeville ".....	477 08	382 37		859 45
Orillia ".....		108 55		108 55
Ottawa parliamentary and departmental buildings:				
Parliament buildings and library, renewing wiring.....		6,416 36		6,416 36
West block, reconstruction after fire, including new furniture.....	17,099 61			17,099 61
East block, new elevator.....	2,955 61			2,955 61
Langevin block, balance original construction.....	29,165 81			29,165 81
" improvement, steel shelving, etc.....	24,742 07			24,742 07
Generally, balance, electric light, wiring, etc.....	21,628 40			21,628 40
" repairs and furniture.....		111,834 09		111,834 09
" power for running elevators, etc.....			533 00	533 00
" telephone service.....			4,951 31	4,951 31
Ottawa parliament grounds:—				
Maintenance of grounds.....			5,009 29	5,009 29
Removal of snow.....			979 00	979 00
Major's Hill park, fence wall.....	875 00			875 00
" maintenance.....			2,624 03	2,624 03
Experimental farm.....	10,763 35	1,157 10		11,920 45
National Art Gallery.....	1,000 00	374 53		1,374 53
New militia stores.....	4,342 66			4,342 66
Post office, etc., new boiler.....	1,515 80			1,515 80
Supreme Court.....	1,160 26			1,160 26
Rideau Hall, new wing.....	19,273 22			19,273 22
Rideau Hall, repairs and furniture.....		15,324 40		15,324 40
Rideau Hall, grounds, \$2,780.38; watchman, \$547.50; snow, \$589.51; fuel and light, \$8,000.....			11,917 39	11,917 39
Pictou post office.....	29 25			29 25
Pembroke ".....		30 00		30 00
Peterboro' custom house.....		54 17		54 17
" post office.....		218 56		218 56
Petrollea ".....	150 13	33 75		183 88
Port Arthur ".....		171 73		171 73
" Immigration building.....		85 82		85 82
Port Colborne ".....		17 80		17 80
Port Hope ".....		255 45		255 45
Prescott custom house.....		52 61		52 61
Carried forward.....	201,408 04	147,571 64	26,604 02	375,583 70



## SESSIONAL PAPER No. 19

PART II.—STATEMENT A.—EXPENDITURE—*Continued.*

Name of Work.	Construc- tion and Improve- ments.	Repairs and Furniture	Staff and Main- tenance.	Total.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<b>PUBLIC BUILDINGS—<i>Continued.</i></b>				
Brought forward .....	201 408 04	147,571 64	26,104 04	375,083 70
<i>Ontario—Concluded.</i>				
Prescott post office .....		207 80		207 80
Rat Portage " .....	12 028 46	16 50		12,044 96
Sarnia " .....	8,596 70			8,596 70
Smith's Falls .....		17 62		17 62
Stratford " etc. ....		106 25		106 25
Strathroy " .....		103 80		103 80
St. Catharines drill hall. ....	18 00			18 00
post office .....	165 00	905 25		1,070 25
St. Thomas " .....	631 29	748 31		1,379 60
Toronto .....		6,309 10		6,309 10
" post office, Union Station .....		1,056 57		1,056 57
" custom house .....		125 10		125 10
" gas inspectors office .....		34 00		34 00
Trenton post office .....		39 00		39 00
Walkerton " .....		38 63		38 63
Windsor drill hall. ....	29 76			29 76
" post office .....		2,365 30		2,365 30
Woodstock post office .....	10 515 31			10,515 31
Heating, lighting, water, etc., for all buildings in Ontario (for details see page 25) .....			158,325 72	158,325 72
Totals, Ontario .....	233,392 56	159,644 87	184,429 74	577,467 17
<i>Manitoba.</i>				
Brandon post office .....		200 55		200 55
" experimental farm .....	431 87	222 53		654 40
Dauphin Dominion lands office .....		3 25		3 25
" immigration building .....		2 25		2 25
Portage LaPrairie post office .....		52 93		52 93
Selkirk immigration building .....		29 35		29 35
Winnipeg clerk of works office .....		163 80		163 80
" custom house .....	450 00	325 68		775 68
" Dominion lands .....		1,040 88		1,040 88
" exam. warehouse .....		74 20		74 20
" immigration building .....		579 97		579 97
" post office .....	963 69	3,337 40		4,001 09
Vorkton Dominion lands office .....		16 00		16 00
" immigration building .....		13 40		13 40
Heating, lighting, water, &c., for all buildings in Manitoba (for details see page 27) .....			15,652 25	15,652 25
Totals, Manitoba .....	1,545 56	6,071 19	15,652 25	23,269 00
<i>North West Territories.</i>				
Alameda Dominion lands office .....		19 25		19 25
Battleford registry office .....		241 00		241 00
Banff Museum .....		40 55		40 55
Calgary court house .....		561 07		561 07
" immigration building .....		67 50		67 50
" lands office .....		2 50		2 50
Carried forward .....		931 87		931 87

PART II.—STATEMENT A.—EXPENDITURE—*Continued.*

Name of Work.	Construc- tion and Improvements.	Repairs and Furniture	Staff and Main- tenance.	Total.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<b>PUBLIC BUILDINGS—<i>Continued.</i></b>				
Brought forward.....		931 87		931 87
<i>North West Territories.—Continued.</i>				
Calgary Post office.....		206 30		206 30
Edmonton Dominion lands office.....		68 30		68 30
Elkhorn school.....		25 95		25 95
Indian Head experimental farm.....	76 84	46 34		123 18
Lethbridge court house.....		164 75		164 75
" custom house.....		17 50		17 50
" post office.....		52 31		52 31
Macleod custom house.....		87 50		87 50
Medicine Hat court house.....	8,280 71	16 50		8,297 21
Moose Jaw.....	581 15	9 50		590 65
Moosomin.....		7 30		7 30
Prince Albert artesian well.....	1,189 50			1,189 50
" court house.....		355 00		355 00
" lands titles office.....		129 85		129 85
Regina barracks.....		99 33		99 33
" court house.....		166 78		166 78
" government house sidewalk.....	2,408 52	773 76		3,772 28
" immigration building.....		117 25		117 25
" inland revenue office.....		8 50		8 50
" lands titles office.....	10,549 00			10,549 00
" post office.....		85 33		85 33
" registry office.....		33 25		33 25
Rosthern immigration building.....	2,586 00			2,586 00
Strathcona.....	292 29			292 29
Wolsley court house.....		347 26		347 26
Heating, lighting, water, &c., for all buildings in North West Territories (for details, see page 27)			12,655 71	12,655 71
Totals, North West Territories.....	26,261 81	4,042 73	12,655 71	42,960 24
<i>British Columbia</i>				
Agassiz experimental farm.....	62 25			62 25
Atlin, fittings and box fronts for post office.....	980 88			980 88
Discovery post office.....		51 00		51 00
Kamloops.....	221 50			221 50
Nanaimo.....	275 60	672 04		947 64
Nelson public building.....	11,346 07			11,346 07
New Westminster engineer's office.....		907 34		907 34
" custom house.....	639 39	10 25		649 64
" public building.....	13,429 95			13,429 95
" temporary post office.....		170 62		170 62
Rossland public building.....	12,366 12			12,366 12
Vancouver drill hall.....	18,889 00			18,889 00
" exam. warehouse.....		51 37		51 37
" post office.....		1,467 67		1,467 67
Victoria custom house.....		1,135 87		1,135 87
" (old) custom house, fitting up, &c.....		793 13		793 13
" clerk of works office.....		15 50		15 50
" engineers office.....		24 50		24 50
" immigrant shed.....		25 78		25 78
" marine hospital.....		87 66		87 66
" new post office.....	8,527 25			8,527 25
Carried forward.....	66,738 01	5,412 73		72,150 74

## SESSIONAL PAPER No. 19

PART II.—STATEMENT A.—EXPENDITURE—*Continued.*

Name of Work.	Construction and Improvements.	Repairs and Furniture	Staff and Maintenance.	Total.
	\$ cts.	\$ cts	\$ cts.	\$ cts.
<b>PUBLIC BUILDINGS.—Continued.</b>				
Brought forward.....	66,738 01	5,412 73		72,650 74
<i>British Columbia—Concluded.</i>				
Victoria new power for elevator.....			406 20	406 20
" old post office .....		1,537 88		1,537 88
Williams' Head quarantine station.....	1,550 12	515 30		2,065 42
Ymer post office .....		2 00		2 00
Heating, lighting, water, etc., for all buildings in British Columbia (for details, see page 28).....			12,748 28	12,748 28
Totals, British Columbia .....	68,288 13	7,467 91	13,154 48	88,910 52
<i>Yukon Territory.</i>				
Yukon public buildings .....	72,439 73	13,432 05		85,871 78
Heating and lighting for Yukon buildings. (For details see page 29) .....			41,153 66	41,153 66
Totals, Yukon Territory .....	72,439 73	13,432 05	41,153 66	127,025 44
<i>Public Buildings generally.</i>				
Printing, stationery, instruments, travelling, etc. ....			13,614 58	13,614 58

## PART II. - STATEMENT A.—Expenditure—Continued.

Name of Work.	Dredging.	Construc- tion and Improvements.	Repairs.	Staff and Main- tenance.	Total.
HARBOURS AND RIVERS.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<i>Nova Scotia.</i>					
Advocate Harbour.....		992 79			992 79
Arcadia.....			696 34		696 34
Barrington Passage.....			9 94		9 94
"    Wharf.....			1,169 02		1,169 02
Bass Pond.....			600 62		600 62
Beaver River.....			732 70		732 70
Belliveau.....			1,995 04		1,995 04
Birch Hill Cove.....			299 88		299 88
Black Rock.....		500 00			500 00
Blue Rock Breakwater.....			391 28		391 28
Boularderie, Ross Ferry.....			3 96		3 96
Brooklyn wharf.....		1,836 47			1,836 47
Brulé wharf.....			1,097 73		1,097 73
Canada Creek Breakwater.....			1,076 93		1,076 93
Cape Cove.....			624 14		624 14
Chebogue River, Town Point, wharf.....			864 19		864 19
Cheggogin (extension to breakwater).....		604 12			604 12
Cheticamp wharf.....			977 41		977 41
Cheverie wharf.....			903 27		903 27
Chipman's Brook breakwater.....			1,000 00		1,000 00
Church Point pier.....			815 08		815 08
Clark's Harbour.....			3,076 64		3,076 64
Coffin's Island.....			269 75		269 75
Cook's Cove.....	1,387 41				1,387 41
Cow Bay breakwater.....			3,409 10		3,409 10
Cribbin's Point.....			317 92		317 92
Digby.....			173 56		173 56
Devil's Island.....			97 13		97 13
East Chezetcook.....		980 83			980 83
East Bay, North side.....			300 00		300 00
East Ragged Island.....		1,248 00			1,248 00
East Tracadie breakwater.....		933 22			933 22
Eatonville wharf.....			971 35		971 35
Englishtown wharf.....		3,737 95			3,737 95
Fox Island breakwater.....			216 16		216 16
Georgeville.....			109 96		109 96
Gabarus Bay breakwater.....		26 00			26 00
Grand Etang.....	3,209 90		154 34		3,454 24
Gunning Cove.....		1,476 43			1,476 43
Halifax Graving Dock.....				10,000 00	10,000 00
Halifax I. C. R'y wharfs, \$2,625; whole refunded by I. C. R'y.....		1,522 00			1,522 00
Hall's Harbour.....		7,911 88			7,911 88
Harbour au Bouche.....					
Harbourville.....		2,397 90			2,397 90
Hunt's Point.....		1,805 64			1,805 64
Ingonish, North Bay.....		3,784 84			3,784 84
Iona wharf.....		1,514 53			1,514 53
Jordan Bay, East.....			1,172 29		1,172 29
Judique, McKay's Point.....		6,103 00			6,103 00
L'Ardoise.....			1,472 12		1,472 12
Little Brook.....			180 75		180 75
Livingston Cove.....		2,746 13			2,746 13
Lockport.....		2,948 98			2,948 98
Carried forward.....	12,599 19	35,158 83	25,178 60	10,000 00	82,936 62

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PART II.—STATEMENT A.—EXPENDITURE—*Continued.*

Name of Work.	Dredging.	Construction and Improvements.	Repairs.	Staff and Maintenance.	Total.
HARBOURS AND RIVERS.— <i>Con.</i>	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Brought forward.....	12,599 19	35,158 83	25,178 83	10,000 00	82,936 62
<i>Nova Scotia.—Concluded.</i>					
McNair's Cove.....			574 21		574 21
Malignant Cove.....		3,878 35			3,878 35
Margaree Island Wharf.....		2,000 00			2,000 00
Merigomish, Big Island.....		919 00			919 00
" Harbour.....		252 26			252 26
Meteghan (Cove) Breakwater.....			2,000 00		2,000 00
" River.....		4,200 03			4,200 03
Milton.....	248 71				248 71
Morden.....			1,553 02		1,553 02
Mill Creek.....			1,904 70		1,904 70
Newellton, Cape Island.....		1,955 92			1,955 92
New Harbour.....		1,308 59			1,308 59
Oyster Pond.....			149 75		149 75
Parker's Cove.....		1,177 54			1,177 54
Petit de Grat.....			453 59		453 59
Pictou Light (beach protection).....			191 11		191 11
Pictou, Acadia Coal Co's wharf \$225.00 (whole refunded by comp.).....					
" Bar.....	1,262 05				1,262 05
" Landing, \$4,800.00 (whole refunded by I. C. R.).....					
Port George.....			398 50		398 50
Porter's Lake.....		244 25			244 25
Port Hilford.....		2,241 19			2,241 19
Port Hood.....			699 99		699 99
Port Latour.....		3,201 87			3,201 87
Port Maitland (Yarmouth Co.).....			2,246 46		2,246 46
Port Medway.....			485 72		485 72
Port Mouton.....			1,981 57		1,981 57
Red Head, Roseway.....			2,098 87		2,098 87
River Hebert Village.....		485 00			485 00
River John.....		449 94			449 94
St. Ann's North River.....		1,526 32			1,526 32
Salmon River, Digby Co.....		2,400 00			2,400 00
Sanford (or Cranberry Head).....		2,599 96			2,599 96
Saulnierville Wharf.....		399 93			399 93
Saw Pit Wharf.....		820 24			820 24
Seaside Wharf.....			3 96		3 96
Shag Harbour Wharf.....		1,950 93			1,950 93
Spencer's Island.....			859 42		859 42
Summerville.....			601 68		601 68
Swim's Point.....		199 99			199 99
Tancook Island.....			991 60		991 60
Tatamagouche.....			246 00		246 00
Trout Cove.....		780 00	1,748 50		2,528 50
Upper Port Latour.....		698 97			698 97
" Wood's Harbour.....		901 00			901 00
West Chezzetcook.....			300 00		300 00
West Berlin.....		1,486 83			1,486 83
Whycocomagh.....		669 80			669 80
Windsor Harbour.....		6,168 49			6,168 49
Wolfville.....		162 75			162 75
Carried forward.....	14,109 95	78,237 98	44,667 25	10,000 00	147,015 18

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## PART II.—STATEMENT A.—EXPENDITURE.—Continued.

Name of Work.	Dredging.	Construction and Improvements.	Repairs.	Staff and Maintenance.	Total.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<b>HARBOURS AND RIVERS.—Con.</b>					
Brought forward .....	14,109 95	78,237 98	44,667 25	10,000 00	147,015 18
<i>Nova Scotia.—Concluded.</i>					
Yarmouth .....	13,108 17				13,108 17
Yarmouth Bar .....		970 29			970 29
Young's Landing .....		795 58			795 58
Harbours generally, N. S. ....				1,654 25	1,654 25
Totals, Nova Scotia .....	27,218 12	80,003 85	44,667 25	11,654 25	163,543 47
<i>Prince Edward Island.</i>					
Annandale .....			39 93		39 93
Bay View .....			83 93		83 93
Brae .....			54 54		54 54
Canoe Cove .....		140 97			140 97
China Point .....			2,207 00		2,207 00
Chapel Pier .....			396 27		396 27
Charlottetown P. E. I. Ry. Wharf ..	2,546 78				2,546 78
" Poole's " .....	919 41				919 41
Clifton Pier .....			292 95		292 95
French River .....	5,194 01				5,194 01
Haggarty wharf .....			85 00		85 00
Higgins Shore Pier .....			16 50		16 50
Malpeque .....	4,914 04				4,914 04
Miminigash, addition to North'n B'wat'r		988 00			988 00
" works-repairs .....			997 87		997 87
New London .....			236 14		236 14
North Cardigan .....			308 61		308 61
Rocky Point .....		1,447 43			1,447 43
St. Peter's Bay .....			554 37		554 37
Souris, Knight's Point .....		4,742 27			4,742 27
Sturgeon Pier .....			101 75		101 75
Summerside Harbour .....	2,472 37	192 19			2,664 56
Tignish .....			2,093 82		2,093 82
West Point Pier .....		37 73			37 73
Harbours generally P. E. I. expenses of staff ..				929 41	929 41
Harbours generally, creosoted timber for minor repairs ..			1,800 00		1,800 00
Totals, Prince Edward, Island ..	16,046 61	7,548 50	9,268 68	929 41	33,793 20
<i>New Brunswick.</i>					
Bay du Vin .....			610 04		610 04
Black Brook wharf .....		30 59			30 59
Buctouche .....			1,094 05		1,094 05
Burnt Church .....		1,516 00			1,516 00
Campbelton ballast wharf .....			1,727 84		1,727 84
Campobello (Wilson's Beach) .....			187 19		187 19
Cape Tormentine .....			7,486 18		7,486 18
Chatham custom house wharf .....			2,046 18		2,046 18
Clifton breakwater .....			6,086 92		6,086 92
Cocagne .....			663 46		663 46
Carried forward .....		1,546 59	19,901 86		21,448 45

## SESSIONAL PAPER No. 19

## PART II.—STATEMENT A.—EXPENDITURE—Continued.

Name of Work.	Dredging.	Construction and Improvements.	Repairs	Staff and Maintenance.	Total.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
HARBOURS AND RIVERS.— <i>Con.</i>					
Brought forward.....		1,546 59	19,901 86		21,448 45
<i>New Brunswick.—Continued.</i>					
Dalhousie.....			3 165 37		3,165 37
Edgett's Landing.....			499 99		499 99
Hopewell Cape-wharf.....		28 87			28 87
" " repairs to wharf.....			409 21		409 21
Jenseg.....	974 84				974 84
La Tête, St-George.....		313 65			313 65
L'Etang.....		388 84			388 84
Main River Bridge.....		2,448 66			2,448 66
Point du Chene.....			68 24		68 24
Richibucto.....			3,982 27		3,982 27
River St. John, including tributaries.....		640 20	2,072 37		2,712 57
" Ox Island.....		680 96			680 96
" Robinsons Bar.....	2,861 54				2,861 54
" Springhill.....	4,563 92				4,563 92
St. John Harbour, Negro Point B' water.....			4,911 89		4,911 89
" " (Fort Dufferin).....			800 00		800 00
" winter berths.....	7,394 09				7,394 09
St. Nicholas River.....		1,500 00			1,500 00
Salmon River (Queen's Co. Ward's shoal).....	5,026 42				5,026 42
Salmon River (Queen's Co.) Curley's shoal.....	4,011 80				4,011 80
Shippegan Harbour.....			2,538 31		2,538 31
" wharf at Lameque.....		114 63			114 63
Tracadie.....			375 47		375 47
Upper Salmon River.....			305 84		305 84
Generally.....				1,654 26	1,654 26
Totals, New Brunswick.....	25,513 57	6,981 44	39,030 82	1,654 26	73,180 09
<i>Quebec.</i>					
Anse à Beaufils.....		4,910 53			4,910 53
Anse au Gascons (Pt. Daniel East).....		2,754 00			2,754 00
Anse St. Jean.....			501 00		501 00
Baie St. Paul (Cap aux Corbeaux).....		10 067 20	614 99		10,682 19
Beauport Wharf.....		4,009 08			4 009 08
Berthier (en bas).....			4,739 51		4,739 51
Buckingham.....			160 00		160 00
Cacouna.....		5,118 94			5,118 94
Cap à l'Aigle.....			1,488 62		1,488 62
Cap Santé.....		821 70			821 70
Cap Santé Wharf.....		4,006 24			4,006 24
Chicoutimi.....		5,050 59			5,050 59
Coteau Landing.....	1,760 57				1,760 57
Cote Ste. Catherine.....		3,199 46			3,199 46
Dorval.....	2,630 00				2,630 00
East Templeton.....	610 00				610 00
Étang du Nord.....			400 90		400 90
Gatineau River.....			92 35		92 35
Graham.....		1,125 76			1,125 76
Grande Rivière.....			100 00		100 00
Grosse Isle.....			1,639 21		1,639 21
Carried forward.....	5,000 57	41,063 50	9,736 58		55,800 65

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PART II.—STATEMENT A.—EXPENDITURE—*Continued.*

Name of Work.	Dredging.	Construction and Improvements.	Repairs.	Staff and Maintenance.	Total.
	\$ cts	\$ cts.	\$ cts.	\$ cts.	\$ cts.
HARBOURS AND RIVERS— <i>Con.</i>					
Brought forward.....	5,000 57	41,063 50	9,736 58	.....	55,800 65
<i>Quebec—Continued.</i>					
Iberville Wharf.....		2,068 94	.....	.....	2,068 94
Ile aux Coudres.....			50 00	.....	50 00
Ile Perrot.....	896 00		165 81	.....	1,061 81
Ile aux Grues, northshore.....		436 44	.....	.....	436 44
Ile Verte.....			500 93	.....	500 93
Kamouraska Wharf.....		2,029 76	.....	.....	2,029 76
Knowlton Landing.....			714 12	.....	714 12
Lake St. John Piers.....				.....	.....
Peribonka.....	\$ 118 92			.....	.....
Rivière à la Pipe.....	2,499 00			.....	.....
Generally.....	6 23			.....	.....
St. Filician.....	343 07			.....	.....
St. Gédéon.....	3,006 86			.....	.....
St. Jérôme.....	4,969 79			.....	.....
Roberval.....	406 79			.....	.....
	200 00	10,912 50	268 22	.....	11,380 72
Lake St. John—placing buoys—					
Ashouapmouchouan.....	\$ 68 22			.....	.....
Grand Décharge.....	5 68			.....	.....
Mistassini.....	3 42			.....	.....
Peribonka.....	28 43			.....	.....
Roberval Harbour.....	1,293 40			.....	.....
	1,487 73			250 00	1,737 73
Lanoraie.....			884 92	.....	884 92
Lévis Graving Dock.....		21,441 94		5,599 48	27,041 42
Les Eboulements.....			3,613 51	.....	3,613 51
Les Ecureuils.....			841 73	.....	841 73
L'Islet.....			1,149 99	.....	1,149 99
Longueuil Wharf.....			2,017 21	.....	2,017 21
Lotbinière.....	1,798 04			.....	1,798 04
Lower St. Lawrence.....		608 82	.....	.....	608 82
Magdalen.....		3,409 27	.....	.....	3,409 27
Magog.....			530 07	.....	530 07
Matane.....		239 70	.....	.....	239 70
Montreal Harb. Improvements.....		1,196 51	.....	.....	1,196 51
New Carlisle.....			2,000 07	.....	2,000 07
Newport Breakwater.....		1,460 67	.....	.....	1,460 67
Nicolet.....	3,230 15		.....	.....	3,230 15
Percé.....		217 25	.....	.....	217 25
Piers below Quebec.....				1,682 54	1,682 54
Pointe aux Esquimaux.....		491 81	.....	.....	491 81
Pointe Claire.....	2,074 00			150 00	2 224 00
Pointe Claire wharf.....		665 25	.....	.....	665 25
Port au Persil.....			394 48	.....	394 48
Rimouski.....			2,499 67	.....	2,499 67
River Batiscan.....	10 00		.....	.....	10 00
Rivière du Lièvre.....	9,433 50			804 63	10,238 13
" " lock and dam.....				1,579 85	1,579 85
River Cap de Chatte.....				1,999 08	1,999 08
" Chateauguay.....	3,737 00		.....	.....	3,737 00
Rivière du Loup (en bas).....			3,241 79	.....	3,241 79
" " (en haut).....	5,267 50		.....	.....	5 267 50
Carried forward.....	33,134 49	86,272 36	28,600 19	6,466 10	154,482 14



## SESSIONAL PAPER No 19

PART II.—STATEMENT A.—EXPENDITURE—*Continued.*

Name of Work.	Dredging.	Construc- tion and Improve- ments.	Repairs.	Staff and Main- tenance.	Total.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
HARBOURS AND RIVERS— <i>Con.</i>					
Brought forward.....	33,134 49	86,272 36	28,609 19	6,466 10	154,482 14
<i>Quebec—Concluded.</i>					
Rivière Onelle (St. Denis).....			827 63		827 63
" an Renards .....			2,850 10		2,850 10
" Richelieu (Belœil channel)...	2,369 41	3,073 43		154 50	5,597 34
" Ste Anne de la Pêrade .....			24 00		24 00
" St. Francis .....	2,145 01				2,145 01
" St. Lawrence ship channel*...	413,138 69				413,138 69
" St. Louis head gates .....				120 00	120 00
" St. Maurice, at mouth.....	3,461 30				3,461 30
" St. Maurice, Grandes Piles to Latuque .....	2,830 00				2,830 00
St. Alexis Baie des Ha Ha .....		4,086 16			4,086 16
St. Alphonse (Bagotville) .....			599 60		599 60
St. André de Kamouraska .....		7,000 00			7,000 00
Ste. Anne de Belleville .....		2,152 00			2,152 00
Ste. Anne de Sorel, ice pier.....		1,009 19			1,009 19
Ste. Anne du Saguenay .....		1,580 14			1,580 14
St. Antoine de Tilly .....			305 31		305 31
Ste. Emilie de Lotbinière.....		299 35			299 35
St. Fulgence .....		1,497 81			1,497 81
Ste. Geneviève .....			605 73		605 73
St. Irenée .....	35 20	1,200 75			1,235 95
St. Jean, Ile d'Orléans.....			254 51		254 51
St. Johns .....	1,153 60				1,153 60
St. Laurent .....	81 82		4,092 81		4,174 63
St. Michael .....	6,972 22		400 84		7,373 06
St. Nicholas .....	1,721 56				1,721 56
St. Jean des Chaillons .....		1,418 48			1,418 48
St. Roch des Aulnaies .....		3,864 80			3,864 80
St. Timothée .....			801 45		801 45
Sabrevois .....		4,482 94			4,482 94
Saguenay River .....				25 00	25 00
Sillery Cove .....		4,077 28			4,077 28
Verdun wharf .....		2,353 23			2,353 23
Trois Pistoles .....			299 38		299 38
Valleyfield .....	510 00				510 00
Woburn .....			1,060 92		1,060 92
Yamaska .....	453 00		47 83	751 21	1,252 09
Generally .....	6,079 97			3,313 67	9,393 64
Totals, Quebec.....	474,086 27	124,367 92	40,779 35	16,429 96	655,663 50
<i>Ontario.</i>					
Amherstburg .....			364 95		364 95
Bayfield Harbour .....		3,176 72			3,176 72
Beaverton .....			194 77		194 77
Belleville .....	444 27				444 27
Bowmanville .....		5,013 07			5,013 07
Bruce Mines Wharf .....		1,939 85			1,939 85
Carried forward.....	444 27	10,129 64	559 72		11,133 63

\* This expenditure covers improvements and repairs of plant as well as working expenses.

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PART II.—STATEMENT A.—EXPENDITURE—*Continued.*

Name of Work.	Dredging.		Construc- tion and Improve- ments.	Repairs.	Staff and Main- tenance.	Total.
	\$	cts.	\$	cts.	\$	cts.
HARBOURS AND RIVERS.— <i>Con.</i>						
Brought forward.....	444	27	10,129	64	559	72
<i>Ontario.—Con.</i>						
Burlington Channel and Bridge .....				1,842	41	1,868
Cobourg .....	548	25				548
Collingwood .....	430	63	41,616	99		42,047
Dyer's Bay .....				63	83	63
Goderich .....	10,377	04	19,740	00	3,546	27
Hawkesbury .....	3,091	25				3,091
Hawkestone's new wharf.....			835	26		835
Honora Bay wharf .....			4	00		4
Jordan .....	254	88				254
Kaministiquia .....	11,148	46				11,148
Keen (head of Indian River) .....			598	55		598
Kincardine .....	5,982	00		1,595	32	7,577
Kingston graving dock .....			1,947	94	6,102	32
Kingston Harbour .....	4,891	90				4,891
Lakes Simcoe and Couchiching .....				28	50	28
L'Orignal .....				59	95	59
Little Current .....			2,099	77		2,099
Meaford .....	1,000	72				1,000
Midland .....	2,311	10				2,311
Newcastle .....	211	19				211
North Bay pile wharf .....			6,982	78		6,982
Oakville .....	761	87		3,833	79	4,595
Oshawa .....	351	51				351
Otonabee River .....			1,975	10		1,975
Owen Sound Harbour .....	10,897	12				10,897
Pictou .....	4,814	76				4,814
Pointe Pelee Island .....			20	24		20
Port Burwell .....	12,918	01	31,659	96		44,577
Port Colborne .....			340	25		340
Port Dover .....	25,000	00				25,000
Port Elgin .....			833	16		833
Port Findlay .....			1,953	25		1,953
Port Hope .....	1,481	61		499	31	1,980
Port Stanley .....			13,007	43		13,007
Portsmouth .....			2,018	20		2,018
Providence Bay .....			254	66		254
Rainy River (Long Sault Rapids) .....				15	00	15
Rockland .....	1,040	00				1,040
River Thames .....	156	87				156
Rondeau Harbour .....	3,989	75		6,356	50	10,346
Sarnia .....	1	49				1
Saugeen River.....	3,088	00				3,088
Sault Ste. Marie Wharf .....				872	25	872
Scugog River.....	3,137	65				3,137
Shiguindah .....			132	80		132
Southampton .....	71	82		199	64	271
South Nation River .....	700	21				700
Tobermory .....				15	75	15
Thornbury .....	2,411	13				2,411
Toronto Harbour.....	16,893	73	4,305	16		21,258
Toronto, diversion of Don .....			41	45		41
Carried forward.....	128,407	22	140,556	59	19,488	24
					7,970	80
						296,422
						85

## SESSIONAL PAPER No. 19

PART II.—STATEMENT A.—EXPENDITURE—*Continued.*

Name of Work.	Dredging.	Construction and Improvements.	Repairs.	Staff and Maintenance.	Total.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
HARBOURS AND RIVERS— <i>Con.</i>					
Brought forward.....	128,407 22	140,556 59	19,488 24	7,970 80	296,422 85
<i>Ontario.—Continued.</i>					
Whitby .....	2,286 82				2,286 82
Wolfe Island .....	1,014 40				1,014 40
Washago Falls .....			7 50		7 50
Generally Out .....	2,320 67			6,412 45	8,733 12
Totals, Ontario.....	122,880 65	151,705 05	19,495 74	14,383 25	308,464 69
<i>Manitoba.</i>					
Gimli wharf.....		9,000 55			9,000 55
Harbours generally, Man.....				1,627 76	1,627 76
Lake Manitoba .....		8,122 65			8,122 65
Red River, mouth .....	8,032 22				8,032 22
"    St. Andrews Rapids.....		6,501 21			6,501 21
Totals, Manitoba.....	8,032 22	23,624 41		1 627 76	33,284 39
<i>North West Territories.</i>					
Harbours, Rivers and Bridges generally.....				1,805 10	1,805 10
Totals, North West Terr.....				1,805 10	1,805 10
<i>British Columbia.</i>					
Columbia River, improvements above Golden .....	3,047 27				3,047 27
Columbia River in narrows between upper and lower Arrow Lakes.....		6,991 02			6,991 02
"    protection of banks at Revelstoke .....		10,500 00			10,500 00
"    removal of rocks above Revelstoke .....		2,449 42			2,449 42
Duncan River improvement .....		2,820 40			2,820 40
Esquimalt graving dock.....				13,262 07	13,262 07
Fraser River, protection work.....		24,921 00			24,921 00
"    "    snagging .....	8,716 00				8,716 00
Kootenay River below Fort Steel.....		2,793 37			2,793 37
Nanaimo Harbour (south channel) .....	9,759 99				9,759 99
Serpentine River.....	177 05				177 05
Skeena River.....		3,456 06			3,456 06
Somas River.....			14 00		14 00
Victoria Harbour.....	5,270 50		21 50		5,292 00
William's Head, quarantine station.....			1,652 10		1,652 10
Generally .....				2,360 88	2,360 88
Totals, British Columbia.....	26,970 81	53,931 27	1,687 60	15,622 95	98,212 63

PART II.—STATEMENT A.—EXPENDITURE—*Continued.*

Name of Work,	Dredging.	Construc- tion and Improve- ments.	Repairs.	Staff and Main- tenance.	Total.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
HARBOURS AND RIVERS.— <i>Con.</i>					
<i>Yukon Territory.</i>					
Lewis and Yukon Rivers .....		61,750 96			61,750 96
Totals, Yukon .....		61,750 96			61,750 96
Harbours and Rivers generally, general expenses of staffs. &c.....	3,194 15			5,148 36	8,342 51

## SESSIONAL PAPER No. 19

PART II.—STATEMENT A.—EXPENDITURE—*Continued.*

Name of Work.	Construction and Improvements.	Repairs and Furniture	Staff and Maintenance.	Total.
<b>DREDGES AND DREDGING PLANT.</b>	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Maritime provinces.....	5,791 54	6,960 19		12,750 73
Ontario and Quebec .....	23,799 51	17,131 23		40,930 74
Manitoba.....		3,687 82		3,687 82
British Columbia.....	150 00	1,985 53		2,135 53
<b>Totals, Dredges.....</b>	<b>29,741 05</b>	<b>28,803 77</b>		<b>58,544 82</b>
<b>SLIDES AND BOOMS.</b>				
St. Maurice district.....	30,393 46	13,330 02	12,957 87	56,681 35
Ottawa .....			22,366 88	22,366 88
Ottawa River.....		5,538 30		5,538 30
Cheneaux boom, allowance to improvement				
Co .....			1,304 46	1,304 46
Gatineau River, Quebec.....		755 48		755 48
Coulonge .....		4,082 50		4,082 50
Black .....		556 18		556 18
Dumoine .....		231 10		231 10
Madawaska, River Ont.....		1,362 66		1,362 66
Petawawa .....		2,017 86		2,017 86
Trent (or Newcastle district) works.....	1,596 67	903 93	1,700 72	4,201 32
Collection of slide and boom dues.....			1,897 58	1,897 58
<b>Totals, Slides and Booms.....</b>	<b>31,980 13</b>	<b>28,778 03</b>	<b>40,227 51</b>	<b>100,985 67</b>
<b>ROADS AND BRIDGES.</b>				
<i>Quebec.</i>				
Chambly, Yule bridge, (Richelieu River).....			172 55	172 55
<i>Ontario.</i>				
Des Joachims bridge (Ottawa River).....	553 52			553 52
Ottawa, Maria street bridge.....	10,505 71			10,505 71
" Sappers' bridge .....	910 37			910 37
" Chaudière bridges, reconstruction.....	3,181 00			3,181 00
" City streets and bridges, repaired and maintained by Government.....		7,139 79	2,823 11	9,962 90
Portage du Fort bridge .....	1,909 09			1,909 09
York bridge (Grand River).....		748 00	50 00	798 00
<i>North West Territories</i>				
Battleford bridge (Battle River).....		400 53		400 53
Banff bridge (Spray River).....	912 68			912 68
Calgary bridge (Bow River).....		647 88		647 88
Edmonton bridge (Saskatchewan).....	16,102 25			16,102 25
Macleod bridge (Old Man's River).....		496 50		496 50
Swan River Road .....	2,000 00			2,000 00
Trail, from Edmonton toward Yukon Territory...	9,386 02			9,386 02
<i>Yukon Territory.</i>				
Trails and Roads generally .....	102,749 01			102,749 01
<b>Totals, Roads and Bridges.....</b>	<b>148,209 65</b>	<b>9,432 70</b>	<b>3,045 66</b>	<b>160,688 01</b>

PART II.—STATEMENTS A.—EXPENDITURE—*Continued.*

Name of Work.	Construction and Improvements.	Repairs and Furniture	Staff and Maintenance.	Total.
TELEGRAPH LINES.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<i>Newfoundland.</i>				
Cape Ray line (subsidy) .....			250 00	250 00
<i>Nova Scotia.</i>				
Cape Sable line .....			25 00	25 00
Cheticamp " .....	5,291 35	2,036 89	1,138 72	8,466 96
Low Point " .....			50 00	50 00
Meat Cove .....			2,080 19	2,080 19
<i>Prince Edward Island.</i>				
Prince Edward Island and Mainland Cable (sub.) .....			1,946 66	1,946 66
<i>New Brunswick.</i>				
Escuminac line .....			497 71	497 71
Bay of Fundy line .....			1,891 54	1,891 54
<i>Quebec.</i>				
Anticosti-Gaspé line .....			4,593 73	4,593 73
Grosse Isle quarantine line .....			933 92	933 92
Magdalen Island line .....			2,571 12	2,571 12
North shore St. Lawrence lines .....				
East of Bersimis .....	41,405 95	2,425 00	6,054 25	49,885 20
West of Bersimis .....			4,493 45	4,493 45
St. Flavie to Quebec .....	4,783 13			4,783 13
<i>Maritime Provinces and Gulf Generally.</i>				
General Expenses .....			5,227 73	5,227 73
<i>Ontario.</i>				
Pelee Island line .....		1,252 59	248 62	1,501 21
<i>North West Territories.</i>				
Generally .....			15,277 55	15,277 55
<i>British Columbia.</i>				
Alberni Cape Beale line .....	2,401 52		1,165 65	3,567 17
Ashcroft Barkerville " .....			3,629 36	3,629 36
Nanaimo Comox " .....	698 00		4,244 64	4,942 64
Kamloops Nicola " .....	4,301 40			4,301 40
Quesnelle Atlin " .....	223,044 77			223,044 77
Victoria Cape Beale " .....			4,494 02	4,494 02
<i>Yukon Territory.</i>				
Bennett-Dawson-Atlin line .....	157,209 34		15,639 43	172,848 77
<i>Generally.</i>				
Telegraph Service generally .....			1,196 24	1,196 24
Totals, Telegraphs .....	439,135 46	5,714 48	77,659 53	522,509 47

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PART II.—STATEMENT A.—EXPENDITURE—*Continued.*

Name of Work.	Construction and Improvements.	Repairs and Furniture	Staff and Maintenance.	Total.
MISCELLANEOUS.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Statue of Her Majesty the Queen in commemoration of the Diamond Jubilee .....	6,000 00			6,000 00
Gratuity to Joseph Vallière, for damages received on Coulonge works .....			350 00	350 00
Gratuity to widow of late Emery Lafontaine, C. E. ....			333 33	333 33
Fire of 26th April, 1900—cost of bringing fire brigades from Montreal, Brockville and Peterboro' .....			450 00	450 00
Surveys and Inspections .....			18,623 28	18,623 28
Public Works Agency, B.C. ....			2,090 96	2,090 96
Departmental Technical Library .....	20 64			20 64
Temporary employees—				
Secretary and Accountant's staffs .....			24,909 81	24,909 81
Chief architect's staff .....			19,985 63	19,985 63
Chief engineer's staff .....			41,988 75	41,988 75
Supt. telegraph service and staff .....			2,809 92	2,809 92
Departmental photographer .....			700 00	700 00
Totals, Miscellaneous .....	6,020 64		112,421 68	118,442 32

PART II. - STATEMENT A.—Expenditure—*Continued*

Name of Work.	Dredging.	Construc- tion and Improvements.	Repairs.	Staff and Main- tenance.	Total.
RECAPITULATION.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Totals, Public Buildings—					
Nova Scotia.....		79,327 75	3,991 34	19,759 47	103,078 56
Prince Edward Island.....			1,826 52	5,024 26	6,850 78
New Brunswick.....		22,994 19	6,128 67	20,659 03	49,781 89
Quebec.....		20,287 47	59,928 27	49,631 50	129,847 24
Ontario.....		233,392 56	159,644 87	184,429 74	577,467 17
Manitoba.....		1,545 56	6,071 19	15,652 25	23,269 00
North-West Territories.....		26,261 81	4,042 72	12,655 71	42,960 24
British Columbia.....		68,288 13	7,467 91	13,154 48	88,910 52
Yukon Territory.....		72,439 73	13,432 05	41,153 66	127,025 44
Public Buildings generally.....				13,614 58	13,614 58
Totals, Harbours and Rivers—					
Nova Scotia.....	27,218 12	80,003 85	44,667 25	11,654 25	163,543 47
Prince Edward Island.....	16,046 61	7,548 59	9,268 68	929 41	33,793 29
New Brunswick.....	25,513 57	6,981 44	39,030 82	1,654 26	73,180 09
Quebec.....	474,086 27	124,367 92	40,779 35	16,429 96	655,663 50
Ontario.....	122,880 65	151,705 05	19,495 74	14,383 25	308,464 69
Manitoba.....	8,032 22	23,624 41		1,627 76	33,284 39
North-West Territories.....				1,805 10	1,805 10
British Columbia.....	26,970 81	53,931 27	1,687 60	15,622 95	98,212 63
Yukon Territory.....		61,750 96			61,750 96
Harbours and Rivers generally.....	3,194 15			5,148 36	8,342 51
Totals, dredges and dredging plant.....		29,741 05	29,803 77		59,544 82
" slides and booms.....		31,980 13	28,778 03	40,227 51	100,985 67
" roads and bridges.....		148,209 65	9,432 70	3,045 66	160,688 01
" telegraph lines.....		439,135 46	5,714 48	77,659 53	522,509 47
" miscellaneous.....		6,020 64		112,421 68	118,442 32
	703,942 40	1,689,547 62	491,191 96	678,344 36	3,563,026 34

(End of Statement A.)



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## STATEMENT B.—Showing the cost of the following services for each Public Building, viz :—

Rent ; Salaries of, and Supplies for, Caretakers, Engineers, &c. ; Heating ; Lighting ; Water ; (the total for each province being carried into Statement " A. "

Name of Building.	Rents.	Salaries of engineers &c	Heating.	Lighting	Water.	Total.
<i>Nova Scotia.</i>	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Amherst post office.....		402 23	226 10	269 45	20 00	917 78
Annapolis ".....		412 97	163 72	146 96	40 00	763 65
Antigonish ".....		401 78	75 04	62 80	10 00	549 62
Arichat custom house.....			39 00			39 00
" post office.....		2 60	74 00			76 60
" savings bank.....			35 00			35 00
Baddeck post office.....		217 25	108 00	21 96		347 21
Dartmouth ".....		250 00	53 35	96 60	22 10	422 05
Halifax Asst. Receiver General's Office.....	1,200 00			45 65	17 40	1,263 05
Halifax, Dominion building.....	1,968 00	13 50	505 09	2,231 80		4,718 39
" drill shed.....	600 00	1 50	112 10			713 60
" engineer's office.....	362 00					362 00
" examining wareh's.....	1,000 00	405 20	140 70	53 60	38 39	1,637 94
" immigrant shed.....		600 00	241 30	315 74		1,177 04
Liverpool post office, &c.....			38 75			38 75
Lunenburg " &c.....		315 40	178 00	106 15	59 00	658 55
New Glasgow ".....		306 50	132 42	276 61	100 00	815 53
North Sydney post office.....		355 81	121 00	249 95	22 00	748 76
Pictou custom house.....		4 27	112 57	10 35		127 19
" post office.....		359 39	92 72	197 63	20 30	670 04
Sydney post office.....		358 08	121 00	137 16	15 00	631 24
Truro custom house.....				10 68		10 68
" examining warehouse.....				7 01		7 01
" post office.....		359 01	139 00	260 94	75 00	833 95
Windsor post office.....		425 79	195 32	148 43	75 00	844 54
Yarmouth " &c.....		399 98	264 15	561 40	72 00	1,297 53
Totals, Nova Scotia, carried to statement A, page 3.....	2,562 00	8,159 26	3,168 38	5,230 87	586 19	19,706 70
<i>Prince Edward Island.</i>						
Charlottetown Dominion B'g.....		1,762 04	563 80	892 23	225 00	3,243 07
" engineers office.....	200 00					200 00
Montague post office.....		164 44	55 95	13 34		233 73
Summerside ".....		429 85	319 15	98 46		847 46
Totals, Prince Edw. Island, carried to statement A, page 3.....	200 00	2,356 33	738 90	1,004 03	225 00	4,524 26
<i>New Brunswick.</i>						
Bathurst post office, &c.....		458 02	314 37	24 50		796 89
Carleton, St. John, P. O., &c.....		100 00	54 43	75 00		229 43
Chatham post office, &c.....		315 11	312 38	125 25		752 74
Dalhousie " &c.....		414 22	200 63	2 70		617 55
Fredericton " &c.....		400 00	277 01	611 79	48 00	1,336 80
Moncton " &c.....		400 00	188 48	264 12	134 00	986 60
Newcastle " &c.....		411 30	290 78	130 20		841 28
Carried forward.....		2,498 65	1,647 08	1,233 56	182 00	5,561 29

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PART II.—STATEMENT B.—Showing the cost of the following services for each Public Building, &c. — *Continued.*

Name of Building.	Rents.	Salaries of engineers &c.	Heating.	Lighting.	Water	Total.
<i>New Brunswick—Con.</i>	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Brought forward.....		2,498 65	1,647 08	1,233 56	182 00	5,561 29
Portland, St. John, post office	130 90		4 25			135 15
St. John custom house.....	22 00	1,825 80	1,441 65	472 57	495 06	4,257 08
" post office.....		1,369 10	528 41	4,343 14	686 15	6,926 80
" savings bank.....			216 41	105 76	17 52	339 69
Tracadie, lazaretto.....		187 50	1,091 79			1,279 29
St. Stephen's, post office, &c.	400 00		87 18	272 70	64 00	823 88
Sussex " ".....		204 63	225 66	84 10		514 39
Woodstock " ".....		477 32	189 89	120 25	34 00	821 46
Totals, New Brunswick, carried to Statement A, page 4	152 90	6,963 00	5,432 32	6,632 08	1,478 73	20,659 03
<i>Quebec.</i>						
Aylmer post office.....		62 40	147 00	41 11	33 00	283 51
Berthierville ".....		8 75	88 07	13 84	11 00	121 66
Coaticook ".....		412 15	158 30	242 61	40 00	853 06
Dundee custom house.....			36 25			36 25
Hull post office, etc., (old)		285 20	250 23	222 42	92 02	849 87
" " temporary.....	60 00					60 00
Joliette " etc.....		387 79	138 52	56 05	108 00	690 36
Lachine ".....		103 80	134 03	64 30	29 52	331 65
Laprairie ".....		53 43	129 11	32 57	40 00	255 11
Lévis immigrant building.....			54 96			54 96
Montreal, custom house.....		1,147 86	670 35	369 58	319 13	2,446 92
" public buildings, generally.....		1,700 00				1,700 00
" drill hall.....		742 50				742 50
" examining ware- house.....		1,896 36	2,015 23	544 56	483 67	4,939 82
" immigration office	500 00				20 37	520 37
" inland revenue office.....		606 70	205 50	125 82	90 91	1,037 93
" post office.....		4,900 03	803 95	3,932 61	702 77	10,339 36
Farnham ".....		14 46	64 50			78 96
" civil service exam. "99.....	100 00					100 00
Quebec Citadel buildings.....		43 20	267 02	215 07		525 29
" cutlers' office.....		540 00	179 46			719 46
" custom house.....		576 05	614 06	100 89	800 00	2,091 00
" engineers office.....	144 00					144 00
" examining ware- house.....		1,522 40	555 60	94 33	450 00	2,622 33
" immigrant building.....			321 94	12 56		334 44
" observatory.....					50 00	50 00
" post office.....		1,380 75	625 08	762 38	750 00	3,518 21
" Queen's wharf build- ing.....			371 07		750 00	1,121 07
Richmond post office.....		263 50	303 03	151 53		718 06
Rimouski ".....		181 49	26 00	13 59	25 00	246 08
Carried forward....	804 00	16,818 82	8,159 20	6,336 76	4,814 39	37,533 17

## SESSIONAL PAPER No. 19

PART II.—STATEMENT B.—Showing the cost of the following services for each Public Building, &c.—*Continued.*

Name of Building.	Rents.	Salaries of engineers &c.	Heating.	Lighting.	Water.	Total.
<i>Quebec.</i> —Concluded.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Brought forward.....	804 00	16,818 82	8,159 20	6,936 76	4,814 39	37,533 17
Rivière du Loup (Fraser- ville) post office.....		277 41	281 77	91 98		651 16
Sherbrooke post office, &c.....		461 07	356 81	632 11	50 00	1,499 99
Sorel ".....		457 86	328 10	355 90	250 00	1,391 86
St. Henri ".....		1 40	158 20	75 42	29 28	264 30
St. Hyacinthe ".....		437 68	234 49	345 33	150 00	1,167 50
St. Jérôme ".....		75 00	187 76	192 00	57 00	511 76
St. John's ".....		356 66	46 00	187 50	120 00	710 16
St. Lin (Laurentides).....	300 00					300 00
St. Roch post office.....			57 20	43 24		100 44
St. Thomas de Montmagny, post office.....		2 08	43 00	34 65		79 73
St. Vincent de Paul p't'y.....			120 00			120 00
Three Rivers custom house.....		322 37	303 05	93 02	84 00	802 44
" post office.....		433 39	241 50	94 17	62 00	831 06
Valleyfield ".....	329 70		56 74	43 05		429 49
West Farnham ".....			1 00	50 00	10 00	61 00
Totals Quebec, carried to Statement A, page 5.....	1,433 70	19,643 74	10,574 82	9,174 13	5,626 67	46,443 06
<i>Ontario.</i>						
Almonte, post office, &c.....		405 04	156 50	32 21	75 00	668 75
Amherstburg " &c.....		415 86	138 17	162 00	35 06	751 03
Arnprior.....		412 60	205 48	157 12	25 00	800 20
Barrie ".....		412 35	259 00	158 21	50 00	879 56
Belleville ".....		624 06	530 70	357 76	83 25	1,595 77
Berlin ".....		521 74	156 38	325 12	56 71	1,059 95
Brampton ".....		411 15	137 40	131 70	31 25	711 50
Brantford ".....		611 33	306 88	245 96	34 20	1,198 37
Brockville ".....		410 60	304 50	472 60	170 00	1,357 70
Carleton Place ".....		310 95	128 00	55 00		493 95
Cayuga ".....		57 45	95 94	54 38		207 77
Chatham ".....		423 14	186 43	222 60	40 00	872 17
Cobourg ".....		400 00	178 00	176 25	45 50	799 75
Cornwall ".....		475 00	257 00	377 45	75 00	1,184 45
Dundas ".....	500 00	50 00	16 75	52 00		618 75
Galt ".....		414 80	190 25	224 81	32 50	862 36
Gananoque, custom house.....			108 00	94 00		202 00
" post office.....		17 07	86 47	141 00		244 54
Goderich ".....		364 00	190 64	91 80	60 00	706 44
Guelph ".....		418 09	180 91	174 82	37 44	811 26
Hamilton drill shed.....		450 00				450 00
" post office, &c.....	1,634 43		844 22	869 52	1,020 30	4,368 47
Ingersoll ".....			30 00			30 00
Kingston custom house.....		137 35	216 00	46 10	63 35	462 80
" exam. warehouse.....			25 50		12 95	38 45
" inland revenue office.....				53 00	77 49	130 49
" military college.....		1,456 50				1,456 50
" post office.....		108 90	215 75	398 85	48 78	772 28
Lindsay ".....		400 00	143 31	75 00	20 00	638 31
Carried forward.....	500 00	11,342 41	5,288 78	5,149 26	2,063 72	24,374 17

PART II.—STATEMENT B.—Showing the cost of the following services for each Public Building, &c.—*Continued.*

Name of Building.	Rents.	Salaries of engineers &c.	Heating.	Lighting	Water.	Total.
<i>Ontario.</i> —Continued.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Brought forward . . .	500 00	11,342 41	5,288 78	5,149 26	2,083 72	24,374 17
London custom house . . . . .		1,102 83	575 16	467 97	140 00	2,285 96
" post office . . . . .		722 55	506 13	1,691 05	80 00	2,999 73
Napanee post office . . . . .		496 66	211 75	136 20	75 04	919 65
Niagara Falls post office, &c. . . . .		347 80	158 62	325 00	57 50	888 92
Orangeville post office . . . . .		444 11	111 88	149 15	20 00	725 14
Orillia " . . . . .		195 00	125 23	108 77	29 25	458 25
Ottawa experimental farm . . . . .			1,055 51	69 80	102 00	1,227 31
" geological museum . . . . .		744 00	727 80	240 85		1,712 65
" national art gallery and fisher. museum . . . . .		540 00	106 95	6 09		653 04
" North west mounted police stores . . . . .			60 45			60 45
" parliamentary and dept buildings . . . . .	5 00	25,355 27	23,924 58	12,944 99	3,196 67	65,426 51
" post office . . . . .		1,008 00	650 30	963 45		2,621 75
" printing bureau . . . . .		3,694 15	4,592 80	797 13		9,084 08
" supreme court . . . . .		1,270 28	448 88	266 83		1,985 99
Ottawa rented buildings:—						
Bank of Ottawa (Dept. Interior) . . . . .				105 37		105 37
Boundary commission offices . . . . .	1,100 00			51 40		1,151 40
coal shed (canal basin) . . . . .	400 00					400 00
Duries Chamb. (Militia) examining warehouse . . . . .	323 50					323 50
French translator's off's Gas inspector's office . . . . .	850 00			5 55		855 55
Geolog. museum annex. Molson's Bank (Fisheries department) . . . . .	420 00		32 02	195 45		647 47
Observatory . . . . .				4 95		4 95
Slater's Chamb. (model room) . . . . .	600 00					600 00
Slater's Chambers (P.O. department) . . . . .	240 00			6 18		246 18
Workshops and lumber yard of department public works . . . . .				21 67		21 67
" . . . . .	2,125 00			6 39		2,131 39
" . . . . .	45 00					45 00
Pembroke post office . . . . .	901 64	662 50	1,125 75	651 95		3,341 84
Peterboro' custom house . . . . .		455 31	197 53	148 50	28 00	829 34
" post office . . . . .		330 00	157 62	122 50	72 75	682 87
Petrolea " . . . . .		343 95	167 85	322 50	56 25	890 55
Port Arthur " . . . . .		448 00	151 98	38 55	37 20	675 82
Port Colborne " . . . . .		354 70	154 00	100 85		609 55
Port Hope " . . . . .		275 60	31 25	100 75	10 00	417 60
Prescott custom house . . . . .		469 76	176 67	226 00		872 43
" post office . . . . .			89 80		140 00	229 80
Rat Portage post office . . . . .		447 52	179 95	45 07		672 54
Smith's Falls post office, &c. . . . .		64 42				64 42
Stratford post office, &c. . . . .		335 50	146 80	122 20	85 00	689 50
Strathroy " . . . . .		734 50	321 76	183 94	65 67	1,305 87
St. Catharines post office . . . . .		450 54	167 85	50 36	3 00	671 75
" . . . . .		452 01	173 52	168 05	62 70	856 28
Carried forward . . . . .	7,510 14	53,087 46	41,819 17	25,994 72	6,354 75	134,766 24

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PART II.—STATEMENT B.—Showing the cost of the following services for each Public Building, etc.—*Continued.*

Name of Building.	Rents.	Salaries of engineers &c.	Heating.	Lighting.	Water.	Total.
<i>Ontario.—Concluded.</i>	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Brought forward.....	7,510 14	53,087 46	41,819 17	25,994 72	6,354 75	134,766 24
St. Thomas post office.....		462 86	254 50	644 70	71 52	1,433 58
Toronto civil service exami- nation office.....	47 00					47 00
Toronto custom house.....		716 00	411 57	73 80	116 19	1,317 56
“ Dominion Public Buildings generally.....		29 69				29 69
Toronto drill shed.....		1,215 90				1,215 90
“ engineers office.....	300 00					300 00
“ exam. warehouse.....		4,894 98	1,037 18	59 67	101 55	6,093 38
“ inland revenue office.....		660 00	280 74	133 40	26 18	1,100 32
“ post office.....		2,415 73	942 77	3,133 31	333 82	6,825 63
“ “ Union station.....	871 20			198 65		1,069 85
Trenton post office.....		541 66	176 60	157 50	75 00	950 76
Walkerton “.....		442 91	188 25	211 80	23 25	866 21
Windsor “.....		837 49	430 14	936 97	96 00	2,300 60
Totals Ontario, carried to Statement A, page 7..	8,728 34	65,314 68	45,540 92	31,544 52	7,197 26	158,325 72
<i>Manitoba.</i>						
Brandon Dominion lands office.....		47 30			76 00	123 30
Brandon experimental farm. “ post office, &c.....		660 00	691 80	516 10		1,867 90
Dauphin Dominion lands office.....	180 00		99 75			279 75
Deloraine Dominion lands office.....	210 00					210 00
Minnedosa Dominion lands office.....			122 25			122 25
Portage LaPrairie post office.....		455 22	433 97	205 30		1,094 49
Winnipeg custom house.....		280 35	735 99	300 97	101 10	1,418 41
“ Dominion lands office.....			192 50	26 10	31 58	250 18
“ engineers office.....	318 25					318 25
“ exam. warehouse.....		3 45	256 50	10 35		270 30
“ immigrant shed.....		1 50	835 00	246 52	131 62	1,214 64
“ post office.....		3,125 14	2,969 94	1,719 41	458 75	8,273 24
Selkirk (East.) immigr. shed. “.....	10 00					10 00
Totals Manitoba, carried to Statement A, page 7..	718 25	4,572 96	6,537 24	3,024 75	799 05	15,652 25
<i>North West Territories.</i>						
Alameda Dominion lands office.....	195 00					195 00
Calgary court house, &c.....		632 25	261 39	53 80	300 00	1,247 44
“ immigrant building.....			152 62			152 62
“ land and reg. off.....		76 10	48 90			125 00
“ post office.....		530 00	449 36	364 50	340 00	1,683 86
Brought forward.....	195 00	1,238 35	912 27	418 30	640 00	3,403 92

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PART II.—STATEMENT B.—Showing the cost of the following services for each Public Building, &c.—*Continued.*

Name of Building.	Rents.	Salaries of engineers, etc.	Heating.	Lighting.	Water.	Total.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
<i>North-West Terr.—Con.</i>						
Brought forward ....	195 00	1,238 35	912 27	418 30	640 00	3,403 92
Edmonton Dominion Lands office .....	144 00					144 00
Edmonton immigrant shed .....			5 00			5 00
" registry office .....		449 21	162 50	130 05		741 76
Indian head experimental farm .....			250 00			250 00
Lethbridge court house and custom house .....		486 24	124 50	18 00	60 00	688 80
Lethbridge post office .....		25 25	37 50	50 83		113 58
Macleod custom house .....			89 94			89 94
" court house .....	250 00	189 58	40 67			480 25
Moose Jaw court house .....		441 00	83 25			524 91
Moosomin court house .....		621 05	373 36			994 41
Prince Albert court house, etc .....	65 00	64 50				129 50
Prince Albert immigrant shed .....			10 00			10 00
Prince Albert registry office .....		442 74	162 50			605 24
Red Deer Dominion Lands office .....	24 00		70 75			94 75
Red Deer immigrant shed .....	116 00					116 00
Regina clerk of works office .....	90 00					90 00
" court house .....		463 20	812 50	72 74		1,348 44
" Dominion Lands office .....	600 00		106 00			706 00
" post office .....		430 10	274 00			713 10
" registry office .....	135 00	5 00	204 00			344 00
Strathcona immigrant shed .....			75 00			75 00
Wolseley court house .....		504 00	240 06			824 06
" post office .....				15 65		15 65
Yorkton Dominion Lands office .....	136 80					136 80
Totals, N. W. T., carried to Statement A, page 8 .....	1,755 80	5,459 88	4,034 40	705 63	700 00	12,655 71
<i>British Columbia.</i>						
Agassiz experimental farm .....			92 47			92 47
Kamloops Dominion Lands office .....	150 00					150 00
Nanaimo post office .....		670 55	188 42	187 35	27 00	1,082 32
" officers' quarters .....			32 62			32 62
New Westminster engineer's office .....	910 85		21 80	22 77	8 13	963 55
New Westminster post office .....		660 00	99 75	92 00	28 00	879 75
Vancouver drill hall .....			28 26			28 26
" examining ware- house .....	330 00			479 21		809 21
" post office .....		545 79	278 36	1,493 08	91 91	2,409 14
Victoria drill hall .....			134 72			134 72
" Indian office .....			10 90			10 90
Carried forward .....	1,390 83	1,885 34	887 30	2,274 41	155 04	6,592 92

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PART II.—STATEMENT B.—Showing the cost of the following services for each Public Building, etc.—*Concluded.*

Name of Building.	Rents.	Salaries of engineers, etc.	Heating.	Lighting.	Water.	Total.
<i>British Columbia—Con.</i>	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Brought forward.....	1,390 83	1,885 34	887 30	2,274 41	155 04	6,592 92
Victoria military store.....			90 05			90 05
" old custom house.....			52 23	8 75	41 65	102 63
" old post office.....					46 95	46 95
" post office.....		2,233 25	377 28	1,683 01	66 70	4,360 24
William's Head quarantine station.....			1,555 49			1,555 49
Totals, British Columbia car- ried to Statement A, page 9	1,390 83	4,118 59	2,962 35	3,966 17	310 34	12,748 28
<i>Yukon Territory.</i>						
Yukon public buildings.....	28,818 14		9,942 57	2,392 95		41,153 66
Totals, Yukon Terr., carried to Statement A, page 9....	28,818 14		9,942 57	2,392 95		41,153 66

(End of Statement B.)

## STATEMENT C.—Showing amount loaned by Government under the authority of special Acts of Parliament and upon the recommendation of the Minister of Public Works, during the fiscal year 1899-1900.

Loaned to Harbour Commissioners of Montreal, for improvement of Harbour. (Acts 59 Vict., Ch. 10, and 61 Vict., Ch. 47).....	\$400,000 00
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A. G. KINGSTON,

DEPARTMENT OF PUBLIC WORKS,  
ACCOUNTANT'S OFFICE,*Accountant*

OTTAWA, 26th December, 1900.





PART III.

REPORT ON PUBLIC BUILDINGS

THROUGHOUT THE DOMINION

FOR THE FISCAL YEAR ENDED 30TH JUNE, 1900

BY THE

CHIEF ARCHITECT



# REPORT OF THE CHIEF ARCHITECT

DEPARTMENT OF PUBLIC WORKS, CANADA,  
CHIEF ARCHITECT'S OFFICE,

OTTAWA, 10th December, 1900.

SIR,—I beg to transmit to you, herewith, my annual report on works in connection with the Dominion Public Buildings, that were executed during the fiscal year ended 30th June, 1900.

I have the honour to be,

Sir,

Your obedient servant,

D. EWART,  
*Chief Architect.*

Jos. R. ROY,  
Acting Secretary,  
Dept. Public Works,  
Ottawa.

## PROVINCE OF PRINCE EDWARD ISLAND.

### CHARLOTTETOWN.

#### PUBLIC BUILDING.

A raised platform to facilitate reception and dispatch of mails was built at the mail entrance in the rear. The entire plumbing was removed from this building and replaced by a new system. There are 8 water-closets, 2 urinals, 1 wash tub, 11 lavatory basins, 1 bath and 2 sinks. The drain now connects with the city sewer.

#### MONTAGUE.

#### POST OFFICE.

Two stone steps were provided at principal entrance, and a plank sidewalk as well.

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## SUMMERSIDE.

## PUBLIC BUILDING.

The original plumbing being unserviceable and obsolete, was removed, excepting cistern and tanks.

The original soil pipe was replaced by a new 4-in. cast iron soil pipe, vent pipes, traps for existing fixtures, etc., etc. A lavatory basin was fitted up in post office. The well in yard was cleaned, drilled 4 inches diameter for a depth of 40 feet, and lined with a 3-in. casing tube. A force pump was fitted up and connected with well and cistern in attic.

A concrete floor was laid in basement, the attic walls and ceilings were white-washed, 23 window blinds were furnished and also new yard gates.

## PROVINCE OF NOVA SCOTIA.

## ANNAPOLIS.

## PUBLIC BUILDING.

All the exterior and interior wood-work and metal work was cleaned and painted, the interior walls and ceilings cleaned and kalsomined and the radiators bronzed ; some articles of furniture were supplied to the post office and repairs effected to sidewalk around and about building.

## ANTIGONISH.

## POST OFFICE.

The office of the public works engineer was re-floored and supplied with blinds, fittings and furniture, and also a photographer's dark closet, a lavatory basin and sink.

## HALIFAX.

## DOMINION BUILDINGS.

A new heating coil was fitted up in Customs parcels office, the stonework of gable and the brickwork of boilers were repaired, a partition in dead letter office was altered in position, the janitor's quarters were cleaned and kalsomined, and repairs were effected to heating, plumbing, furniture, lock-boxes, etc.

Work supervised by C. E. W. Dodwell, resident engineer and inspector of public buildings, Nova Scotia, Halifax.

## HALIFAX.

## DRILL HALL.

This building is completed and fitted up ready for occupation.

## HALIFAX.

## EXAMINING WAREHOUSE.

Repairs were made to plumbing and goods hoist, and a new lavatory basin fitted up under the supervision of C. E. W. Dodwell, resident engineer and inspector of public buildings, Nova Scotia, Halifax.

## HALIFAX.

## IMMIGRATION BUILDING.

A new water closet with iron grated floor was built on east end of building ; two chimneys were taken down and made good ; the Matron's rooms were tinted ; additions were made to the electric light system and repairs to plumbing, heating, windows, doors, etc., under the supervision of C. E. W. Dodwell, resident engineer and inspector of public buildings, Nova Scotia, Halifax.

## KENTVILLE.

## PUBLIC BUILDING.

A contract for the construction of this building which was described in my report of last year, was entered into Aug. 28th, 1899, and works are in progress. Plans for a hot water heating apparatus are prepared.

Plans, etc., prepared by this department.

Clerk of works, L. C. Dodge.

Contractor, James Reid.

## LAWLOR'S ISLAND.

## QUARANTINE STATION.

A concrete tank 26 feet diameter by 12 feet deep, for storage of salt water for flushing purposes, was constructed. The ground around third-class building was graded, levelled and gravelled, and a new roadway constructed leading therefrom to south end of disinfection building. The third-class temporary detention building referred to in my report of last year was converted into a permanent detention building for second class, containing 21 rooms, baths, water closets, etc., and had new kitchens 6 x 30 feet, with two rooms over added in rear.

The small-pox hospitals were repaired and enclosed by fences and converted into wards of detention. A 4-in. pipe was laid from pump in disinfection building on wharf to first, second and third class buildings, hospital and storage tank. Tile drains were laid, one 500 feet long and cesspit from water closet, sinks and baths of first class detention building and another from foundation of tank. Water supply services for baths, water closets and sinks was laid in first and second class buildings and hospital connected with the pump on wharf.

Works carried out under the supervision of C. E. W. Dodwell, resident engineer and inspector of public buildings, Nova Scotia, Halifax, N.S.

Superintendent of building construction, J. E. Ellis, of this department, Ottawa.

Mechanical superintendent, John Cowan, of this department, Ottawa.

## LIVERPOOL.

## POST OFFICE.

This building has been completed, fitted up and furnished.

Plans, etc., prepared by this department.

Clerk of works, J. H. Dexter, Liverpool.

Contractors for building and fittings, Rhodes, Curry & Co., Amherst, N.S.

Contractor for heating apparatus, Frank Powers, Lunenburg, N.S.

## NEW GLASGOW.

## POST OFFICE, ETC., BUILDING.

The urinals on ground floor were removed from this building. A portion of the Inland Revenue long room on first floor was partitioned off for use as two water closet rooms, and a portion of the attic hallway partitioned off for a bathroom and closet. A new cast iron soil pipe was put in, and to this all the existing wash basins as well as the bath and closet basin in attic and the two closet basins on first floor were connected. A number of fittings, some articles of furniture, locks, etc., were supplied to the post office.

## NORTH SYDNEY.

## POST OFFICE, ETC., BUILDING.

The floor of post office was re-laid in hardwood, the interior walls and ceilings were kalsomined, a number of the floors were painted, repairs were made to woodwork, a book case and some chairs furnished, one of the yard gates was renewed and some repairs made to plastering, glazing, etc.

## PICTOU.

## CUSTOM HOUSE.

The footpaths were laid in coal cinders.

## SYDNEY

## POST OFFICE, ETC., BUILDING.

The post office fittings were altered and largely added to.

## TRURO.

## PUBLIC BUILDING.

The sloping roofs of the main building throughout were covered with slate, and the decks of the main building with copper. A new flagpole was erected. A new supply pipe from town service was put in; the furnace was re-painted; a wire screen dividing the public lobby from the post office was put in, extending from the top of the box screen to the ceiling, and a platform scales supplied.

## PROVINCE OF NEW BRUNSWICK.

## BATHURST.

## PUBLIC BUILDING.

The plastered ceiling was boarded and ceiled with sheet steel and repairs made to the post office floor and doors.

## CARLETON (ST. JOHN)

## POST OFFICE

The plastering was repaired and the entrance and vestibule hardwood finish rubbed down, filled and varnished, under the supervision of W. J. McCordock of this department, St. John, N. B.

## DALHOUSIE.

## PUBLIC BUILDING.

A wire screen was put in between the public lobby and the post office, extending from the letter box screen to the ceiling. The roof covering was removed and replaced on the slopes with slate and on the deck with copper.

## FREDERICTON.

## PUBLIC BUILDING.

The brick arch supporting the stone platforms and steps in the rear of the building having become unsafe and dangerous, was repaired and made good.

## NEWCASTLE.

## PUBLIC BUILDING

Some new letter box fronts were put in; the Customs offices were cleaned, painted, and kalsomined, and some carpet was supplied.

## PARTRIGE ISLAND, (ST. JOHN).

## QUARANTINE STATION.

On November 7th, 1899, a contract was entered into for the construction of three wooden buildings on stone foundations, viz:—(1) an hospital, (2) a detention building for immigrants, and (3) a detention building for ship's officers.

The hospital is to be one story, and consists of an administrative block 46 feet long by 36 feet broad with a ward 45 feet long by 25 feet broad adjoining. The administrative block is to have a kitchen and 4 other rooms besides linen closet, pantry, closet, corridor, &c. The ward is to have 2 bath rooms, 3 water closet rooms and a sink room in addition to the dormitory.

The detention building for ship's officers is to consist of a main portion 32 feet by 36 feet and two adjuncts on opposite sides, one 26 feet by 16 feet to contain a wash-house with 4 laundry tubs and a kitchen with a sink—and the other, 26 feet by 38 feet being a dormitory to contain 48 ship berths—the main portion to have 4 offices, a pantry, a water closet room with 4 stalls and a bath room and lavatory with 2 baths and 4 wash basins.

The detention building for immigrants is to be a two story building, 111 feet long by 41 feet 8 inches broad, exclusive of two projecting stairways at the extremities, each 16 feet 8 inches by 11 feet 3 inches, a projection in the front 31 feet by 11 feet 6 inches, and in the rear two adjuncts, one a two story bath and water closet building 49 feet by 21 feet and the other a one story kitchen and laundry building, 27 feet by 30 feet. The main portion of the ground floor is to be undivided and to contain 320 ship berths, the corresponding space on first floor

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being divided into dormitories of various sizes, containing from 6 to 66 berths each, aggregating 246 ship berths. The closet and bath adjunct is to contain on each floor 6 baths, 8 water closets, 12 lavatories and a battery of 5 urinals.

Plans, &c., prepared by the department.

Clerk of Works, George Beatty.

Contractor, John Duffy, St. John, N. B.

Repairs were effected to the dwelling of the medical superintendent and the dioxide blast furnace of the quarantine tug was sheeted with asbestos under the supervision of W. J. McCordock, of this department, St. John, N. B.

### PORTLAND, (ST. JOHN).

#### POST OFFICE.

A hardwood floor was laid in post office and hall to dwelling apartments, an iron protective railing was placed on counter, some brickwork was repointed, a window screen and a fire extinguisher were supplied, and repairs were done to locks, stove, pipes, letter boxes, safe, &c., under the supervision of W. J. McCordock, of this department, St. John.

### ST. JOHN.

#### CUSTOM HOUSE.

Stairs and floors were put in the north and south towers and in the dome. The offices and apartments of the Marine and Fisheries department in south wing, the meteorological offices in north wing, also the caretaker's apartments were cleaned, whitewashed and painted and the hardwood filled and varnished. Repairs were made to pointing, plumbing, bells, tile-work, roof covering, glazing and ironmongery and some linoleum and a few articles of furniture supplied. All the foregoing under the supervision of W. J. McCordock, of this department, St. John, N. B.

### ST. JOHN.

#### POST OFFICE.

Stone-work of front elevation was cleaned from birds nests and had brass wire screens placed over apertures to prevent doves nesting and a portion of the stone-work was pointed. A room formerly devoted to custom postal parcels was added to the newspaper mail room, and fitted up and furnished, 8 offices and corridor on first floor were cleaned, painted and varnished, a 3 stand pipe was fitted up from basement to roof with hydrant and hose on each floor, fire extinguishers were supplied, repairs were effected to plumbing, bells, speaking tubes, glazing, roof covering, elevator, clocks, &c., and some furniture and carpets were supplied. All the foregoing under the supervision of W. J. McCordock, of this department, St. John, N. B.

### ST. JOHN.

#### SAVINGS BANK.

Several of the window sashes were re-hung, the vault was fitted with gas, fire extinguishers were supplied and the coal bins repaired, under the supervision of W. J. McCordock, of this department, St. John, N. B.



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## SUSSEX.

## PUBLIC BUILDING.

A glazed screen dividing the public lobby from the post office was put in, extending from the letter box screen to the ceiling and repairs were made to roof and plastering and a number of the offices kalsomined.

The original hot air heating apparatus, which had become unserviceable, was removed and a hot water heating apparatus substituted.

Plans, etc., prepared by this department. Contractor, H. H. Dryden.

## TRACADIE.

## LAZARETTO.

The original brick oven being unserviceable was replaced by a steel Oxford Portable Oven, and a new ice house was erected.

## WOODSTOCK.

## PUBLIC BUILDING.

The post office floor was re-laid in birch. The entrance door being too heavy for constant use, an additional pair of light doors was provided. A part of the plaster cornice in the Collector of Customs office which had loosened and was dangerous, was taken down and replaced by new.

## PROVINCE OF QUEBEC.

## AYLMER.

## POST OFFICE.

The building was wired for incandescent electric light ; the boundary wall was re-pointed, a portion on the east side re-built and the whole coped with wood and galvanized iron ; window blinds were provided for first floor and attic ; the window frames and sashes were painted ; some trees were planted in the grounds ; a plank walk was laid in yard and a step ladder supplied.

## COATICOOK.

## PUBLIC BUILDING.

The building was wired for incandescent electric light : the sewer pipe was extended and the roof repaired.

## DUNDEF.

## CUSTOM HOUSE.

The beams supporting the joists being decayed were removed and replaced by new beams supported by new stone piers ; the floors on the lower flat were renovated partially in pine and the customs office in maple ; the roof was re-shingled ; the kitchen was sheeted with boards ; repairs were made to the flashing, dormers, steps and fence, and the outside of the building was painted.

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## FARNHAM.

## POST OFFICE.

A new mail entrance doorway with porch steps, also gate and fence were provided.

## FRASERVILLE.

## PUBLIC BUILDING.

Repairs were made to roof, the drain was connected with the sewer, and the porch painted.

## JOLIETTE.

## PUBLIC BUILDING.

A new shed for the caretaker was constructed and some repairs done to the roof of the main building.

## LACHINE.

## POST OFFICE.

The stone-work was re-pointed and a coal stove provided.

## LAPRAIRIE.

## POST OFFICE.

The basement floor was laid in concrete; two new steps were set at front entrance; the joints of the stone-work were pointed and the eaves troughs were repaired.

## SHERBROOKE.

## PUBLIC BUILDING.

A wood and glass screen dividing the public lobby from the post office was put in, extending from the top of the box screen to the ceiling; the roof of main building and examining warehouse were repaired; some carpet and rugs and a quantity of rope matting were supplied. The sidewalks on street line were laid with mastic.

## ST. HYACINTHE.

## PUBLIC BUILDING.

The stone work was repointed; the outside and inside wood work were cleaned and repainted; the inside walls of ground and first floors were kalsomined and the heating coils and pipes bronzed; the ground and first floor ceilings were sheeted with boarding and sheet metal; a granolithic sidewalk was laid on the street line; the drain was overhauled and some articles of furniture supplied.

## ST. HENRY.

## POST OFFICE.

The interior wood work was painted; the walls and ceilings were cleaned and kalsomined and the post office locks repaired.

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## SOREL.

## PUBLIC BUILDING.

The unfinished portion of the attic was finished as rooms, some electric bells were wired, and a portion of the boundary fence renewed.

## VICTORIAVILLE.

## PUBLIC BUILDING.

A contract was entered into on 16th January 1900, for the erection of this building on cadastral lot No. 329, Ste. Victoire d'Arthabaska, said lot having a frontage of 60 ft. on north east side of Grand Trunk Street.

The building is to measure 40 feet 6 inches by 36 feet 6 inches and consist of a stone basement, two brick stories and a wooden mansard attic. There are to be wooden floors and partitions, the slope of roof covered with galvanized iron and the deck with tar and gravel. There are to be wash basins, sinks, bath and w. c., and drainage to the Grand Trunk drain.

The ground floor is to contain a post office, post master's office, customs long room, examining warehouse and an armoury. The upper floors are to be living apartments.

The heating is to be by hot water.

Clerk of works.—Thomas Baril.

Contractors.—Paquet & Godbout.

## PROVINCE OF ONTARIO.

## ALMONTE.

## PUBLIC BUILDING.

The glazing was repaired.

## AMHERSTBURG.

## PUBLIC BUILDING.

The original brass letter box fronts were removed and 332 new pattern boxes substituted; the walls and ceilings were cleaned and kalsomined and the interior wood work painted; a fire escape from the attic was provided; new sanitary plumbing was put in and some minor general repairs effected.

## ARNPRIOR.

## PUBLIC BUILDING.

The grounds were graded and some additional furniture supplied.

## BELLEVILLE.

## PUBLIC BUILDING.

A portion of the woodwork and some letter boxes were painted, a new expansion tank was supplied and repairs were made to locks, glazing, roof, plaster and plumbing.

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## BERLIN.

## PUBLIC BUILDING.

The original hot water furnaces having become unservicable were taken out and replaced by 2 cast iron furnaces of the Buffalo pattern. A number of rooms were painted and papered and minor repairs were made to furniture, glazing, fittings, &c.

## BRAMPTON.

## PUBLIC BUILDING.

A new stamp vendor's wicket was constructed, and repairs were effected to tank, roof and ceiling of attic.

## BROCKVILLE.

## DRILL HALL.

On 29th, June, 1900 a contract was entered into for the construction of this building upon a site bounded on the north by Pine street, the west by East avenue, the south by King street and the east by private property. At the rear, abutting on Pine street is to be the main hall, 150 feet by 75 feet by a mean height of 40 feet, inside dimensions. Along the side facing King street is to be a two story leanto 135 feet long by 32 feet broad, the ground floor for commanding officer's room, armouries, band room and entrance hall and the first floor for mess rooms, shooting gallery, lecture room and caretaker's apartments. That portion of the basement under the five compartments towards East avenue to be excavated for heating apparatus and fuel rooms. The walls are to be of stone and the partitions principally brick. The framing of the hall roof is to be iron with wooden purlins and boarding covered with galvanized iron; the leanto roof of wood covered with felt, tar and gravel composition.

Plans, &c., prepared by this department.

Local architect and clerk of works.—B. Dillon, Brockville, Ont.

Contractor.—D. S. Booth, Brockville, Ont.

## BROCKVILLE.

## PUBLIC BUILDING.

A new brass rail was fitted up in front of the general delivery and some window awnings provided.

## BRANTFORD.

## PUBLIC BUILDING.

A new letter distributing frame was supplied. A new maple floor was put in

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lobby as well as new outside steps, a new wash basin, new partitions, a stamp vendor's office and new screens were supplied ; the counters were altered and repairs made to plumbing.

## CAYUGA.

## POST OFFICE.

The building was piped for gas.

## CHATHAM.

## PUBLIC BUILDING.

A new heating coil and expansion tank were provided, repairs were made to eaves troughs, platform, gates and painting.

## CORNWALL.

## PUBLIC BUILDING.

Tie rods were put in to overcome the bulging of the rear wall of examining warehouse and the wall was pointed.

## GALT.

## PUBLIC BUILDING.

The post office distributing case was repaired.

## GODERICH.

## POST OFFICE.

The inside and outside wood-work and metal work throughout was cleaned and painted, the glazing repaired and the walls and ceilings were cleaned and kalsomined ; some of the letter boxes were altered ; repairs done to wood-work and furniture and a tile drain laid to town sewer.

## GUELPH.

## POST OFFICE.

Some alteration of the fittings were made, some window awnings supplied and repairs were effected to plumbing, wood-work and outside steps.

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## HAMILTON.

## PUBLIC BUILDING.

The building was wired for incandescent electric lighting ; the electric bells were repaired ; the caretaker's quarters were kalsomined and painted , a new sink and some venetian blinds were provided ; the roof of the warehouse was repaired ; the sewer and drain was overhauled and the yard laid with tar macadam.

## INGERSOLL.

## PUBLIC BUILDING.

This building is completed and in process of fitting up for occupation.

Plans, etc., prepared by this department.

Clerks of works, Wm. Watterworth, to 31 Dec., 1899, when he was succeeded by Wm. C. Bell.

Contractor for construction of building and fittings, McCarrol and McKnight, Ingersoll, Ont.

Contractor for heating apparatus, Purdy, Mansell & Co., Toronto, Ont.

## KINGSTON.

## DRILL HALL.

The construction of this building, which was described in my report of last year, is nearly completed. A hot water heating apparatus is being put in and plans are prepared for the fittings and furniture of the armouries, etc.

Plans, etc., prepared and work superintended by this department.

Resident architect and clerk of works, Arthur Ellis, Kingston, Ont.

Contractors for construction of building, Sullivan & Langdon, Kingston, Ont.

Contractors for heating apparatus, McKelvey & Birch, Kingston, Ont.

## KINGSTON.

## POST OFFICE.

Repairs were made to plumbing and glazing and a few articles of furniture supplied.

## LINDSAY.

## PUBLIC BUILDING.

A granolithic street sidewalk was laid and the plumbing of the water closets repaired.

## LONDON.

## CUSTOM HOUSE.

Repairs were made to vault, glazing, &c., and an ensign supplied.

## LONDON—POST OFFICE.

A new one story stone and brick wing 30 feet by 20 feet was built in rear for a newspaper distribution office. A newspaper bag rack was supplied. The brick furnace setting was repaired.

## NAPANEE.

## PUBLIC BUILDING.

Some minor repairs were made to roof, heating coils, pump, glazing, etc.

## NIAGARA FALLS.

## POST OFFICE.

Two unservicable water-closet basins were replaced.

## ORANGEVILLE.

## POST OFFICE.

A granolithic pavement was laid along the street line; two new "Buffalo" hot water heating furnaces were furnished to replace the original furnace which had become unserviceable, and repairs were made to water tank, locks, letter boxes, etc.

The position of the box screen was altered and some minor repairs effected.

## ORILLIA.

## PUBLIC BUILDING.

Some alterations of plumbing were effected.

## OTTAWA.

## CENTRAL EXPERIMENTAL FARM.

The house of the Director and that of the Farm Superintendent were cleaned, tinted, papered and painted. Some carpets, oilcloth, curtains, etc., were supplied the Director's house. The laboratory heating apparatus as well as the addition to the museum apparatus was completed. An acetylene gas apparatus and 8 sinks were fitted up in the new laboratory building. A new bath was fitted up in the director's quarters, a new water-closet in the entomologist's quarters and 2 tanks in the dairy were lined, one with copper and the other with galvanized iron.

Mechanical engineer, Wm. King; clerk of works, F. Breton.

## EASTERN BLOCK—DEPARTMENTAL BUILDING.

Cleaning, tinting and painting were done of a portion of the corridors, 4 offices in the Auditor General's, 12 in the Indian and 3 in the Finance departments. New furniture and fittings were supplied; cupboards and pigeon hole cases, 2 to the Indian department and one each to the Privy Council and Auditor General departments; chairs—8 to Justice, 6 to Auditor General and 1 each to Privy Council and Secretary of State departments; carpets, 3 to Finance, 1 to Justice and 2 to Indian departments; window blinds, 5 to Indian and 1 to Secretary of State departments; window ventilators, 2 to Finance and 3 to Secretary of State departments; book cases, 1 to the Finance department; tables, 3 to the Indian department; mirrors, 2 to Indian department; the Auditor General's department was supplied with 6 filing cabinets, some office shelving, 2 mats, 4 awnings, 1 filter, 3 floors and one cupboard repainted and had repairs made to furniture and glazing. The Finance department was supplied with one clock and 3 chair cushions as well as repairs to office furniture. The Justice department was supplied with 3 clocks, 28 keys, 1 set newspaper files, 1 map rack, 1 set of portable shelving and had one room fitted up with shelving complete. The Privy Council was supplied with 1 map case, 1 clock, 1 screen, 1 deflector, 1 type case, 6 cupboard locks and some minor articles of furniture. A number of panes were reglazed. A portion of one of the rooms in basement west of the westerly stack of W. C.'s was walled off in brick and a brick incinerator for the use of the Comptroller of Currency was constructed and its smoke outlet joined to one of the smoke stacks of the heating system. The roof and skylights were repaired and kept free from snow by the departmental staff. The primary wires of the electric lighting circuit were carried outside the building from the duct to the transformer room.

Additional electric lamps were installed as follows:—8 in the Finance department, 6 in the Justice department, 3 in the Secretary of State department and 3 in the Auditor's department. An additional lavatory basin was fitted in the department of Indian Affairs and another in the Auditor's department. Electric bells were hung in the Prime Minister's office, the Auditor's department and Indian department.

## GOVERNMENT PRINTING BUREAU.

A room for the linotypes was cleaned, tinted, painted and fitted up with partitions, floors, shelving, furniture, etc.

The brick setting of 3 boilers was rebuilt, brick walls were repaired and re-pointed, 17 lavatory basins were taken out and replaced, the drains were overhauled and in part relaid; the connections of 3 boilers were re-arranged; 65 additional electric lights were installed and a number of others re-arranged. Gas pipes were fitted to 10 linotype machines and a number of ventilation pipes put in.

Mechanical engineer,—Wm. King.

Clerks of Works,—F. Breton.

## GEOLOGICAL MUSEUM.

A large quantity of drawers, shelving and other fittings were supplied, a French drain was put in along the north wall, the sewer drains were overhauled and some trees planted. Alterations of two heating coils were made, a thermometer was placed on hot water pipe, 5 argand burners with shades, etc.



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were supplied and the copper still in assay room covered with non-conducting material.

Mechanical engineer—Wm. King,  
Clerk of Works—F. Breton.

## OTTAWA.

## GOVERNMENT HOUSE.

The new wing described in my last year's report is finished and has had the heating, water, lighting and bell services of the main building extended to it and a hot water service for the baths and lavatories put in. All the drains of the house and cottage were tested, overhauled, altered, re-arranged and vented. To replace one of the green-houses which had to be removed in order to furnish the site for the new wing, a new green-house 80 feet by 19 feet 6 inches was built and furnished with a hot water heating apparatus—also was built a cold glass-house 26 by 14 ft. To furnish the site for the green-house a cold glass-house 32 feet by 12 feet had to be removed. The grating of over pit in old conservatory was renewed and the tables therein as well as those of stove-house. A skylight was inserted in roof of main building to light 2 of the water closets. A concrete floor was laid in boiler room. Distemping was done to ceilings of boudoir, studio, passages, ante-room, work-room, pantries, water closets, sink room and 16 bed-rooms in main building; also walls tinted and ceiling distempered of 19 rooms and 3 passages in new wing, as well as the rooms and passages of kitchen wing. The walls of the billiard room, the 'phone room, 8 bed-rooms, the still room, 8 other rooms and the staircase hall on 3 floors, domestic wing, were papered. Painting was done to the walls and wood-work of boudoir, studio, studio passage, the wood-work of billiard and 'phone rooms, ante-room, pantry, ground floor, 5 bedrooms and stairs first floor, 3 rooms and passages, attic floor, 8 rooms, pantry, sink, 2 water closets and passages in domestic wing, the walls of stairway, 3 bath-rooms, 3 water closets and the iron stair in new wing, the external walls of cloak room, chapel and passage as well as to cow stable, store-house, ice-house, dairy, dairyman's house, shelter, curling riuk, parapet at rink, driving track and cow shed. A large quantity of broken glass was renewed throughout the house, cottage, stables, laundry, green-houses, curling rink, &c.

The cloak-room walls were sheeted with paper and boarding, and the passage therein divided by a glazed screen with doors. A part of the basement passage at the house was wainscotted. The back wall of the cowshed and cellar walls of store-house were resheeted. All the rooms of the new wing were supplied with new furniture, carpets, curtains, blinds, mattresses, &c., complete.

For the main building there were supplied 14 easy chairs, 1 couch, 19 sets curtains, 15 rugs, linoleum for water closet and carpet for 2 bedrooms. To the cottage were supplied some matting, a wool square and 2 cocoa mats.

A large glazed gun and rifle case with door, drawers, &c., &c., was fitted up. Six new folding screens were made and repairs and renewals effected to a large number of chairs, sofas, bedsteads, tables, &c., &c., as well as to the stage and scenery. Loose covers for chairs were provided, the carpets, rugs, &c., were lifted and re-laid, a large quantity of crockery, china, glassware, kitchen utensils and some napery were supplied. All the ranges, cook and other stoves throughout the various buildings were cleaned and in part renewed.

The flower garden was improved, re-arranged, the stock of shrubs, plants, bulbs, &c., largely added to and a large quantity of implements supplied thereto and to the kitchen garden.

Some unserviceable sidewalk was taken up and replaced by new and a large

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quantity of fencing, as well as a number of gates similarly treated. The tobaggan slide was overhauled and repaired and a large amount of minor repairs effected throughout the several buildings and the grounds. The main avenue from the corner of Sussex and Pine Streets to the back entrance gate was macadamed 5 inches deep, blended with sand and gravel and rolled. The ice-houses were packed with ice. The roofs, paths, slides, rinks, etc., were cleared of snow by the departmental staff by whom the grounds, lawns, gardens and plant houses were maintained.

The usual periodical cleaning and the packing and unpacking were done; arrangements for and attendance on entertainments were furnished and the rinks, slides, etc., etc., kept in order.

Work carried out and maintained under the supervision of this department by the departmental staff.

Clerk of works, Wm. M. Hutchison.

#### LANGEVIN BLOCK.

The outside steps were resurfaced and repairs were made to cesspool and drain.

The following quantities of furniture were supplied. Tables, 11 to the Interior department, 54 to the Post Office department and 1 to the Agriculture department; chairs, 34 to the Agriculture department, 31 to the Interior department and 15 to the Post Office department; carpets, 5 to the Interior department and 1 to the Agriculture department; book cases and cabinets, 2 to the Interior department and one to the Agriculture department; blinds, 3 to the Agriculture department and 7 to the Interior department; desks, 2 to the Agriculture department and one to the Post Office department; cupboards, 3 to the Interior department; carpets, one to the Agriculture department and 5 to the Interior department; filing cabinets, 1 to the Agriculture department and 1 to the Post Office department; deflectors, 14 to the Post Office department. The Interior department had the geographer's room fitted up with cupboards, pigeon holes, plan cases, tables, etc., complete and was supplied with 2 chests, 1 plan case, 6 chair cushions; 3 curtains, 1 rug, 8 tin door signs, 1 mirror, 1 printing frame, 3 window awnings, 2 door springs, 2 mats, 2 trucks and had the furniture cleaned, repaired and varnished. Cleaning, tiuting and painting was done to 17 offices and a portion of the corridors and 93 panes were reglazed. Steel shelving was put in vault, a partition in one Agriculture department office and a large number of repairs to furniture made as well as minor articles, such as chair cushions, stepladders, etc., etc., supplied

35 large packing cases were supplied for the Paris Exhibit to the Agriculture department. The roof was kept in repair and free from snow during the winter. The brick setting of two heating furnaces was rebuilt.

Additional electric lights were installed as follows:—19 in the Post Office department, 20 in the department of the Interior and 16 in the department of Agriculture; a large number of shades and other fixtures were supplied and alterations made to the wiring generally. A new lavatory basin was set up in Post Office department and some additions made to the electric bell service. Two additional heating coils were fitted up for the department of Agriculture.

Mechanical engineer.—Wm. King.

Clerk of works.—F. Breton.

#### OTTAWA MILITARY STORE BUILDING

On the 11th April, 1900, a contract was entered into for the construction of this building on the Government property, at the rear of the Ottawa drill shed.

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It will comprise a main portion, consisting of basement, ground floor, first floor, second floor and attic, 131 long by 75 feet broad and at one end a one story adjunct 30 feet long by 44 feet broad. The basement walls are to be of stone and the remaining walls, including the partitions, brick; the floor beams and posts are to be iron; the joisting, rafters, floor and roof boards of wood, and the roof covering of copper. Each floor will have one large storeroom, 95 feet long by 66 feet wide, and the remaining space divided into offices. There will be an elevator in the centre of the storerooms.

Plans, etc. prepared and work superintended by this department.

Contractors.—James Bourque & Charles Lemoine.

## MAJOR'S HILL PARK.

The greenhouse floor was laid in cement, the furnace and chimney repaired, new brick flues were built and general repairs made to brick walls, plastering, etc., of greenhouse.

## PARLIAMENT BUILDING.

Cleaning, tinting and painting were done in the translator's office, House of Commons Distribution Offices, as well as 6 other offices of the House of Commons and 5 of the Senate. A portion of the corridors were painted, 400 panes were glazed, repairs done to the painting generally and the rooms of the Deputy Speaker of the House of Commons were papered. A large quantity of shelving and other carpentry was supplied to the House of Commons together with some furniture and carpets including a new Speaker's Chair. A new cement floor was laid in House of Commons engine room and one in that of the Senate, the cement floors of Commons and Senate were repaired; the boiler house ceiling was re-plastered and some of the boiler setting taken down and rebuilt. Repairs were done to plastering, masonry, etc., throughout. The electric wiring of library building was taken out and the building rewired for 416-16 c.p. and 76-32 c.p. lamps with new switchboard, &c. Additional electric lamps were installed, 2 in reporter's room, 4 in room 42, 3 each in Nos. 10 and 11 and in each of the two debates offices and one each in rooms 42, 28, 23 and 13. A new lavatory slab and fittings were supplied room 21, an electric fan for Minister of Railway's room, a set of gas logs for the House of Commons Speaker's dining room, a gas stove for the Senate housekeeper's apartments and a gas heater for the restaurant.

Mechanical engineer, Wm. King.

Clerk of works, F. Breton.

## PARLIAMENT GROUNDS.

Ten cesspools were repaired and furnished with covers, the Lovers' Walk was improved, involving the construction of a large quantity of dry stone wall and some masonry.

## OTTAWA.

## POST OFFICE.

Eight rooms were cleaned, tinted and painted, 83 post office boxes painted, some of the furniture was cleaned and re-varnished and 23 panes re-glazed.

## OTTAWA.

## REPAIRING STREETS, &amp;c.

All the sidewalk about the Printing Bureau was repaired.

Wellington street from Elgin street to Dufferin bridge was repaired. Scraping, cleaning and minor repairs were done to the various roadways and streets under the control of the department. Rubbish, scrapings and ashes were removed from the east block, west block, the workshops, printing bureau, the museums and the various streets and deposited at Nepean Point; the grass at geological museum was kept clipped and the ashes removed from the boiler houses; the roadways, sidewalks, footpaths, roofs and yards were kept clear of snow during the winter.

Work done by the departmental staff.

C. Leblanc, foreman.

## WESTERN BLOCK.

## DEPARTMENTAL BUILDING.

A portion of the basement corridor wooden floor was re-laid in cement concrete; one of the rooms of the Customs department was fitted up as a sugar testing laboratory and furnished.

The photographic studio of the Public Works and Railways departments was fitted up and furnished. The Chief Architect's drawing office was fitted up and partly re-furnished. The cement testing rooms in basement were fitted up. The Chief Engineer's draughting office was divided by partitions with door of communication, and a glazed partition with door was put in on first floor to enclose a portion of the corridor. Nine offices were re-floored in hard wood; 47 rooms were cleaned, tinted and painted; 39 rooms were carpeted; 4 rooms were fitted up with shelving for storage, and the mail room of the Public Works department fitted up with box screen, counter, etc. A large quantity of furniture was supplied, among which were 115 chairs and stools, 75 window blinds, 23 tables, 11 desks, 12 cupboards and 20 toilet cupboards, 10 clocks, 20 mirrors, 11 plan and file cases, 6 book-cases, 3 lounges, 3 screens, 57 chests and boxes, 3 stepladders, 3 deflectors, 12 chair cushions, 4 water coolers, 5 steel filing cabinets, 26 window awnings, 1 filter, 2 rugs, 1 umbrella stand, 1 washstand, and innumerable minor articles, such as door signs, etc.; 262 window panes were glazed; the roofs were repaired and kept clear of snow by the departmental staff.

The three locomotive heating boilers were removed from the boiler house and replaced by four tubular boilers set in brickwork.

The following additional electric lights were installed, viz.: 49 in the Mounted Police department, 41 in the Public Works department, 25 in the Marine department, 4 in the Militia department, 6 in the Railway and Canal department, 10 in the Inland Revenue department, with a large number of shades, switches, etc. A lavatory basin for the Public Works department and one in the Marine department; 2 sinks in the Marine department and one in the Militia department; two electric fans were supplied to the Militia department; a gas heater each to the department of Customs and Public Works and a Bunsen burner to the Customs. Two electric bell connections were made in Public Works department. The sugar testing table in Customs was covered with lead, and a steam coil fitted up in Public Works department.

Mechanical engineer, Wm. King.

Clerk of works, F. Breton.

## OTTAWA.

## SUPREME AND EXCHEQUER COURT BUILDINGS.

Some wooden partitions were painted ; a large pigeon-hole case, 2 bookcases, 3 additional electric lights and 60 boxes were supplied, as well as some repairs done to furniture and 28 panes glazed.

Mechanical engineer, Wm. King.

Clerk of works, F. Breton.

## OTTAWA.

## BUILDINGS AND GROUNDS GENERALLY.

In addition to the works mentioned in connection with the various buildings, the property of the Government, there are similar works of repair, painting, furnishing, tinting, etc., in connection with a number of rented buildings, as well as works of a general character, such as the erection and taking down of porches, the winter boarding of outside steps, the moving of furniture, the putting up and taking down of summer blinds and winter sashes, the beating of carpets, minor repairs to glazing, painting, woodwork, furniture, etc. ; the supplying of packing cases, the removal of the snow from the ground buildings, roads, footpaths, which work was done this year by the departmental staff.

## PETROLIA.

## PUBLIC BUILDING.

A sidewalk on the street line was laid.

## PETERBOROUGH.

## CUSTOM HOUSE.

All the outside and inside wood-work and iron-work were cleaned and painted ; and all the inside walls and ceilings cleaned and kalsomined, the heating coils and pipes were bronzed and the fittings and furniture oiled. The attic apartments were wired for electric lighting. A new pantry was constructed for the caretaker's use. Repairs were made to gates, chimneys, sashes, heating apparatus and water pipes and some hose was supplied.

## PETERBOROUGH.

## POST OFFICE.

The offices, rooms and tower clock which were formerly lighted by gas were wired for lighting by incandescent electric light.

Cobble stone gully drains were laid to drain yard. Repairs were done to lock boxes.

## PORT ARTHUR.

## PUBLIC BUILDING.

The inclosure fence was painted ; the custom house steps were re-set and a new pump for water supply provided.

## PORT HOPE.

## PUBLIC BUILDING.

The brick-work of fence wall and building was repaired and pointed ; galvanized iron drips were put to all stringcourses ; the stone copings and outside steps were re-set ; the slating and flashing of roof were in part renovated ; an additional granolithic walk was laid ; some sodding was laid, the wooden fence was repaired ; the sashes were re-hung ; some window shades were provided ; the baize doors of post office re-covered and some doors and window frames rendered air-tight.

## PRESCOTT.

## CUSTOM HOUSE.

A portion of the chimney was taken down and re-built.

## PRESCOTT.

## POST OFFICE.

The brick-work of chimney and front gable were repaired.

## RAT PORTAGE.

## PUBLIC BUILDING.

This building is nearly completed and is being fitted up for occupation.

Plans, &c., prepared by this department.

Clerk of Works, F. A. Hudson.

Contractor for the construction, Wm. Grierson.

Contractor for the hot water heating apparatus, Purdy, Mansell & Co.

## STRATFORD.

## PUBLIC BUILDING.

The clock dials were painted and new furnace doors provided.

## STRATHROY

### PUBLIC BUILDING.

The building was wired for incandescent lighting.

## ST. THOMAS.

### PUBLIC BUILDING

The interior wood-work was cleaned and painted ; a brick street pavement was laid ; some sodding was done and repairs made to floor, door spring, flag staff, and chandeliers.

## ST. CATHARINES.

### PUBLIC BUILDING

As the large double doors of the main entrance were inadequate the small windows flanking them were altered to doors ; a wooden porch constructed on the stone landing outside ; fire escapes leading from attic were provided ; some additions to and alterations of heating surface were made ; repairs were made to slate and iron covering of roof, attic W. C., brickwork of external walls and the side-walks.

## TORONTO

### DRILL HALL

The galvanized iron roof covering was coated with roofing cement.

## WINDSOR.

### DRILL SHED.

Plans and specifications are prepared for this building which is to have frontages on London Street, Cartier Place and an alleyway. There is to be a main hall 175 ft. by 75 ft. by a mean height of 40 ft. inside dimensions, and a 2 story leanto 200 ft. long by 20 ft. broad along Cartier Place and terminating at London Street in an octagonal turret 3 stories high. The leanto is to contain Commanding Officer's room, band-room, armouries, stairs and lavatories on ground floor and non-commissioned officers' room, shooting gallery and Caretaker's apartments on the first floor.

That portion of the basement under the 5 compartments towards London St. is to be excavated for furnace and fuel rooms.

The walls of the building are to be brick with heavy stone dressings and on stone foundations, and the partitions principally brick. The framing of the roof of hall is to be iron with wooden purlins and boarding covered with galvanized iron ; the leanto roof of wood covered with felt, tar and gravel composition.

Plans, &c., prepared by this department.

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## WINDSOR.

## PUBLIC BUILDING

The roof covering was painted and lock boxes were repaired.

## WOODSTOCK

## PUBLIC BUILDING

This building for the construction of which a contract was entered into on October the 9th 1899, is to be erected on the corner of Dundas and Reeve streets. It is to consist of a main building 2 stories, basement and attic, 70 ft. by 64 ft. and a two story adjunct 36 ft. 6. by 30 ft. 6. The ground floor of the main building is the post office, the first floor the customs and inland revenue offices and the attic is to be divided into living apartments. The adjunct is to contain on the ground floor, the examining warehouse and gas inspection office. There is a brick vault for the post office and one for the customs offices. There is to be a water closet, urinal and sink room on ground floor, a water closet and lavatory room on first floor and a water closet and bath room on attic floor. The external walls are to be stone, the partitions, roofs and floors, except that of basement which is to be of concrete, are to be of wood. On the street corner is to be a square tower one story higher than the main building.

Plans, &c., prepared and work superintended by this department.

Local Architect and Clerk of Works, Alexander White.

Contractor, Jos. A. DesRivières.

## PROVINCE OF MANITOBA.

## BRANDON.

## POST OFFICE

Minor repairs were effected to the heating apparatus.

## WINNIPEG.

## CROWN TIMBER OFFICE

Shelving and furniture were supplied for the offices and the plumbing was repaired.

## WINNIPEG.

## CUSTOM HOUSE

The walls of a number of the rooms were papered, some furniture and heaters were supplied, the gas fitting was altered and extended and repairs were effected to plumbing, chimneys, fittings, &c.



## WINNIPEG.

### IMMIGRATION HALL.

An additional stairs was constructed, the hospital wards were lime washed, some articles of furniture were supplied and repairs effected to heating, plumbing and carpentry.

## WINNIPEG.

### POST OFFICE.

A brick vault was constructed on first floor for the use of inland revenue offices.

Some further alterations of post office screen and fittings were carried out ; the elevator machinery was overhauled and repaired ; McDermott Street was paved with macadam and Post Office lane with cedar block paving ; a safe was supplied the savings bank, a bag rack, pigeon hole cases and articles of furniture to the post office, and repairs effected to plumbing, fittings, furniture, glazing, &c., throughout the building.

## NORTH-WEST TERRITORIES.

### CALGARY, ALTA.

#### IMMIGRATION HALL.

A cooking range and accessories were supplied and the floors of this building painted.

### MEDICINE HAT, ASSA. WEST.

#### COURT HOUSE

On 2nd August, 1899 ; a contract was entered into for the construction of this building to replace that destroyed by fire, June 1897. It is to be a 2 story wooden building on a stone basement, 51 feet by 28 feet. On the ground floor are to be 5 offices, a stairway, hall and 2 cells for prisoners. The first floor will have a court room, a barristers room, a jury room, a judge's room and one extra office. The basement is for fuel, stores, &c. The latrines are to be in a detached building in rear.

Plans, &c., prepared by this department.

Clerk of works, Wm. Knox.

Contractor, Charles Purnal.

### REGINA, ASSA. WEST.

#### COURT HOUSE.

Some automatic ventilators were supplied and minor repairs effected to electric bells, and hot water pipes.

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## MOOSE JAW, ASSA. WEST.

## COURT HOUSE.

An additional 5 feet was added to the length of the building, the cells were taken out, a private stair for the judge was put in and the judge's platform altered ; the walls and ceilings were kalsomined, a counter, a desk, some chairs and a lamp supplied, also some repairs effected to windows and plaster.

## REGINA.

## POST OFFICE.

A stove was supplied and some repairs effected to fittings and pump.

## REGINA.

## DOMINION LANDS AND REGISTRAR OFFICE.

On the 14th. Aug. 1899, a contract was entered into for the construction of this building.

It is to measure 54 ft. by 51 ft. 8" on plan, have two stories of brick on a stone basement and a wooden mansard attic. The partitions and floors, excepting cellar and vaults which are to be brick and cement respectively, are to be wood. There are to be brick vaults each 16 x 18 ft. on the ground and first floors. The basement is to be divided into furnace and fuel room, and 3 store-rooms ; the ground floor is to be divided into registration office, registrar's office, Public Works office, and lavatory room ; the first floor into one large office, 2 small offices and 2 lavatories, and the attic floor into 5 rooms.

Plans, etc. prepared and work superintended by this department.

Clerk of works.—John Morrison.

Contractors.—Willoughby & Wallis.

## REGINA.

## REGISTRY OFFICE.

The stoves were repaired.

## WOLSELEY, ASSA., EAST.

## COURT HOUSE.

An additional heating coil was fitted up in Court room, the ceiling was lined with mineral wool to render it air tight and the eaves troughs were repaired.

## PROVINCE OF BRITISH COLUMBIA.

### NEW WESTMINSTER.

#### PUBLIC BUILDING.

The public building on the corner of Columbia and Sixth streets was destroyed by fire September 10th, 1898, and a contract was entered into, 13th February, 1900, for the construction of a new building on the original site. There is to be a main building 51 ft. by 81 ft. 9", 3 stories, basement and attic, a projecting mail entrance 6 ft. by 16 ft. 9", in rear and a one story detached examining warehouse in yard 39 ft by 24 ft. The exterior walls of the basement and ground floor of the main building, the main cornice and the string courses, pilasters, lintels, etc., of the first and second floor, also the exterior walls of the examining warehouse up to the window sills are of stone. The walls of the first and second stories, the piers in basement and the vaults of the main building, also the walls of the examining warehouse from the window sills up are to be brick. All the partitions, floors and roofs are to be wood excepting the basement floors which are to be concrete.

The ground floor is to be devoted to the local post office service and the upper floors to the customs, inland revenue, caretaker, etc. In the basement are to be the heating furnaces, fuel, etc.

### VANCOUVER.

#### DRILL HALL.

On the 17th day of July, 1899, a contract was entered into for the construction of this building on the corner of Beatty and Dunsmuir Streets with frontage of 186 ft. and 120 ft. respectively. The walls and partitions are to be brick on a stone foundation and having stone string courses, copings, lintels, etc. The roof framing is to be of iron. The floor of the armouries is to be wood, that of the drill hall is to be wood-block on concrete and that of the water closet and lavatory rooms, tiles on concrete and iron.

The drill hall is to measure 74 ft. by 149 ft. inside, 32 ft. from floor to eave and 51 ft. from floor to ridge. Along the front is a leanto 26 ft. broad by the full length of the building; having, in the middle, the main entrance to the building flanked by 2 semi-circular bastions; this middle portion of 3 bays having 3 stories and an excavated basement for heating and fuel, while the remaining basement of the leanto is to be unexcavated. The rear basement of the drill hall is to be excavated along its entire length and finished for a bowling alley and a shooting alley each 15 ft. wide by the full length less 18 ft. at the end devoted to a stairway hall. These alleys are to be divided by a brick wall. The stone outside wall is to be brick-lined and the floor is to be concreted. The ground floor of leanto is to be used as armouries, officers rooms, recreation rooms and closet room, and the first floor as mess rooms, band room and closet room.

Plans, etc., prepared and work supervised by this department.

Clerk of works, Thos. McKinnon.

Contractors, Viau & Lachance.

## GENERALLY.

Repairs and alterations have been executed and sundry articles of furniture, etc., provided, and cleaning, painting and other improvements carried out in connection with a number of buildings, not herein reported.

D. EWART,

*Chief Architect.*

CHIEF ARCHITECT'S OFFICE,

OTTAWA, 15th December, 1900.

## DOMINION PUBLIC BUILDINGS.

30TH JUNE, 1900.

*N. B.—This does not include the Mounted Police Barracks, and such drill sheds as were erected by other than Dominion Government.*

## PROVINCE OF NOVA SCOTIA.

Amherst.....	Public Building.
Annapolis.....	do
Antigonish.....	do
Arichat.....	Post Office.
Baddeck.....	Public Building.
Dartmouth.....	Post Office.
Halifax.....	Dominion Building.
do.....	Drill Hall.
do.....	Examining Warehouse (a rented building)
do.....	Immigration Building.
do.....	Quarantine. (Lawlor's Island.)
Kentville.....	Public Building (in progress.)
Liverpool.....	Post Office.
Lunenburg.....	Marine Hospital.
do.....	Public Building.
Nappan.....	Experimental Farm.
New Glasgow.....	Public Building.
North Sydney.....	do
Pictou.....	Custom House.
do.....	Marine Hospital.
do.....	Post Office.
do.....	Quarantine Station.
Sydney.....	Marine Hospital.
do.....	Public Building.
do.....	Quarantine Station.
Truro.....	Public Building.
Windsor.....	do
Windsor.....	Drill Hall.
Yarmouth.....	Public Building.

## PROVINCE OF PRINCE EDWARD ISLAND.

Charlottetown.....	Dominion Building.
do.....	Quarantine Station (South Port.)
Montague.....	Post Office.
Souris.....	Marine Hospital.
Summerside.....	Public Building.

## PROVINCE OF NEW BRUNSWICK.

Bathurst.....	Public Building.
Carleton.....	Post Office.
Chatham.....	Public Building.

Dalhousie.....	Post Office.
Dorchester.....	Penitentiary.
Douglstown .....	Marine Hospital
Fredericton.....	Infantry School.
do .....	Public Building.
Kingston.....	Marine Hospital.
Middle Island.....	Quarantine
Moncton.....	Public Building.
Newcastle.....	do
do .....	Custom House.
Portland .....	Post Office.
Sackville .....	Marine Hospital.
St. Andrew.....	do
St. John .....	Custom House.
do .....	Drill Hall.
do .....	Marine Hospital.
do .....	Post Office.
do .....	Quarantine, (Partridge Island.)
do .....	Savings Bank.
St. Stephen.....	Public Building.
Sussex .....	do
Tracadie.....	Lazaretto.
Woodstock.....	Public Building.

### PROVINCE OF QUEBEC.

Aylmer.....	Post Office.
Berthierville.....	do
Coaticook.....	Public Building.
Chicoutimi .....	Marine Hospital.
Dundee .....	Custom House.
Fraserville.....	Public Building.
Farnham .....	Post Office.
Grosse Ile.....	Quarantine Station
Hull.....	Post Office.
Joliette.....	Public Building.
Lachine .....	Post Office.
Laprairie.....	do
Lévis.....	Immigration Shed
Montmagny.....	Post Office.
Montreal.....	Custom House.
do .....	Drill Hall.
do .....	Examining Warehouse.
do .....	Inland Revenue Building.
do .....	Immigrant Shed.
do .....	Post Office.
Quebec.....	Cartridge Factory.
do .....	Citadel.
do .....	Custom House.
do .....	Drill Hall.
do .....	Examining Warehouse.
do .....	Immigration Building.
do .....	Marine Agency.
do .....	Observatory.
do .....	Post Office.

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Richmond .....	Public Building.
Rimouski.....	do
St. Henri.....	Post Office.
St. Hyacinthe.....	Public Building.
St. Jérôme.....	do
St. Johns.....	Infantry School.
do .....	Public Building.
St. Régis.....	Custom House.
St. Vincent de Paul.....	Penitentiary.
Sherbrooke .....	Public Building.
Sorel.....	do
Three Rivers.....	Custom House.
do .....	Post Office.
Valleyfield .....	do (rented building).
Victoriaville .....	Public Building (in progress).

## PROVINCE OF ONTARIO.

Almonte .....	Public Building.
Amherstburg .....	do
Arnprior .....	do
Barrie .....	do
Berlin .....	do
Belleville.....	do
Brampton .....	do
Brantford .....	do
Brockville.....	do
do .....	Drill Hall (in progress).
Carleton Place .....	Public Building.
Cayuga .....	Post Office.
Chatham .....	Public Building.
Cobourg .....	do
Cornwall.....	do
Dundas .....	Post Office (rented building).
Galt .....	Public Building.
Gananoque.....	Custom House.
do .....	Post Office.
Goderich .....	Public Building.
Guelph .....	do
Hamilton .....	do
do .....	Drill Hall.
do .....	Immigrant Shed.
do .....	Post Office (old).
do .....	Custom House (old).
Ingersoll .....	Public Building.
Kingston.....	Custom House.
do .....	Drill Hall.
do .....	Immigrant Shed.
do .....	Military College.
do .....	Penitentiary.
do .....	Post Office.
Lindsay .....	Public Building.
London .....	Custom House.
do .....	Infantry School.
do .....	Immigration Station.
do .....	Post Office.

Napanee.....	Public Building.
Niagara Falls.....	do
Orangeville.....	Post Office.
Orillia.....	Public Building.
Ottawa.....	Central Experimental Farm.
do.....	Drill Hall.
do.....	Eastern Departmental Block.
do.....	Fisheries Museum and Art Gallery.
do.....	Geological Museum.
do.....	Government House.
do.....	Langevin Block.
do.....	Military Store Building.
do.....	Observatory.
do.....	Parliament Building.
do.....	Printing Bureau.
do.....	Post Office, Customs and Inland Rev.
do.....	Supreme and Exchequer Courts.
do.....	Western Departmental Block.
Pembroke.....	Public Building.
Petrolia.....	do
Peterborough.....	Custom House.
do.....	Post Office.
Port Arthur.....	Public Building.
Port Colborne.....	do
Port Dalhousie.....	Custom House.
Port Hope.....	Public Building.
Prescott.....	Custom House.
do.....	Fort Wellington.
do.....	Post Office.
Rat Portage.....	Public Building.
Sarnia.....	Immigrant Building.
Smiths Falls.....	Public Building.
St. Catharines.....	do
St. Thomas.....	do
Strathroy.....	do
Stratford.....	do
Toronto.....	Custom House.
do.....	Drill Hall.
do.....	Examining Warehouse.
do.....	Infantry School and Drill Shed.
do.....	Immigration Station.
do.....	Inland Revenue Building.
do.....	Observatory.
do.....	Post Office.
Trenton.....	Public Building.
Walkerton.....	do
Windsor.....	do
Woodstock.....	do (in progress).

# PROVINCE OF MANITOBA.

Brandon.....	Experimental Farm.
do.....	Immigration Building.
do.....	Public Building.



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Birtle .....	Immigration Station.
Dauphin .....	do
Elkhorn .....	Industrial School.
Fort Osborne .....	Infantry School.
Minnedosa ....	Immigration Shed.
Portage la Prairie .....	Public Building.
St. Paul .....	Industrial School.
Stony Mountain .....	Penitentiary.
Winnipeg .....	Custom House.
do .....	Examining Warehouse.
do .....	Government House.
do .....	Immigration Building.
do .....	Lands Office.
do .....	Parliament Building.
do .....	Post Office.

## NORTH-WEST TERRITORIES.

## ALBERTA.

Calgary .....	Court House.
do .....	Immigrant Shed.
do .....	Public Building.
Edmonton .....	Immigrant Shed.
do .....	Registry Office.
Lethbridge .....	Public Building.
Macleod .....	Custom House.
do .....	Court House.
Red Deer .....	Industrial School.
St. Mary's .....	Custom House.

## ASSINIBOIA EAST.

Indian Head .....	Experimental Farm.
Moosomin .....	Court House.
Qu'Appelle .....	Immigrant Shed.
Wolseley .....	Court House.

## ASSINIBOIA WEST.

Medicine Hat .....	Court House.
do .....	Immigration Shed.
Moose Jaw .....	Court House.
Regina .....	do
do .....	Council Chamber.
do .....	Government House.
do .....	Government Offices.
do .....	Industrial School.
do .....	Immigrant Shed.
do .....	Jail and Asylum.
do .....	Lands and Registrar's Office (in progress)
do .....	Post Office.
do .....	Drill Shed and Riding School.

## SASKATCHEWAN.

Battleford.....	Commandant's Residence.
do .....	Government House.
do .....	Immigrant Shed.
do .....	Magistrate's Residence.
do .....	Registrar's Residence.
do .....	Registry Office.
Prince Albert.....	Court House and Jail.
do .....	Immigrant Shed.
do .....	Land and Registry Office.

## BRITISH COLUMBIA.

Agassiz .....	Experimental Farm.
Kamloops .....	Industrial School.
Kuper .....	do
Nanaimo .....	Public Building.
New Westminster .....	Drill Hall.
do .....	Penitentiary.
do .....	Public Building.
Vancouver... ..	Immigrant Building.
do .....	Drill Hall (in progress).
do .....	Gun Shed.
do .....	Public Building.
Victoria.....	Artillery Barracks.
do .....	Drill Hall.
do .....	Marine Hospital.
do .....	Custom House (old).
do .....	Military Storehouse.
do .....	Powder Magazine.
do .....	Public Building.
William's Head.....	Quarantine Station.

PART IV

CHIEF ENGINEER'S REPORT

ON

HARBOUR AND RIVER WORKS,  
INCLUSIVE OF GRAVING DOCKS AND DREDGING  
OPERATIONS. ALSO ROADS, BRIDGES  
AND SURVEYS THROUGHOUT  
THE DOMINION



## Report of the Chief Engineer.

DEPARTMENT OF PUBLIC WORKS OF CANADA,

CHIEF ENGINEER'S OFFICE,

OTTAWA, 22nd. Dec., 1900.

J. R. Roy, Esq., Acting Secretary,  
Department of Public Works.

SIR,—I have the honour to submit my report on the various works under my charge during the fiscal year ended June 30, 1900.

These works comprise the construction and repair of wharfs, piers, breakwaters, dams, weirs, bank and beach protection works; the improvement of harbours and rivers by dredging; the construction, maintenance and operation of Government dredging plant; the construction and maintenance of graving docks; the construction, maintenance and working of slides and booms; the construction and maintenance of interprovincial bridges and approaches thereto, and of bridges on highways, of federal importance in the North-west Territories and the maintenance of military roads; also hydrographic and ordinary surveys and examinations, inclusive of precision levelling and geodetic measurements which are required for the preparation of plans, reports and estimates, the testing of cements, &c.

I have the honour to be, sir,

Your obedient servant,

EUGENE D. LAFLEUR,

*Acting Chief Engineer.*

During the year surveys, examinations or inspections were made  
at the following places.

### PRINCE EDWARD ISLAND.

Alberton Prince Co.	North Cardigan Pier Kings Co.
Bay View Pier Queens Co.	Pinette Pier Queens Co.
Chapel Pier Kings Co.	Rocky Point Prince Co.
Cape Traverse Wharf Prince Co.	Rustico Breakwater Queens Co.
Campbells Cove Kings Co.	Souris Breakwater Kings Co.
China Point Pier Queens Co.	South Rustico Pier Queens Co.
Hurds Point Wharf Prince Co.	Tignish Harbour Prince Co.
Kiers Shore Pier Prince Co.	West Point Wharf Prince Co.
McGees Pier Prince Co.	Victoria Wharf (Crapaud) Prince Co. (east).

### NOVA SCOTIA.

Abbotts Harbour.....	Yarmouth.
Argyle Sound.....	do
Avonport.....	Kings.
Arcadia.....	Yarmouth.
Bass Pond.....	Antigonish.
Bayfield.....	do
Beaver River.....	Digby.
Bell Brook.....	Yarmouth.
Bellevue.....	Digby.
Bay Pond, Little Narrows.....	Victoria.
Birch Hill Cove.....	Antigonish.
Black Rock.....	Victoria.
Blue Rock.....	Antigonish.
Boularderie Centre.....	Victoria.
Brulé.....	Colchester.
Burlington.....	Hants.
Burying Island, Canso.....	Guysboro.
Chebogue Harbour.....	Yarmouth.
Chebogue Town Point.....	do
Clemansport.....	Annapolis.
Comeau Hill.....	Yarmouth.
Cow Bay.....	Cape Breton.
Cheverie.....	Hants.
Chipmans Brook.....	Kings.
Canada Creek.....	do
Cape Cove.....	Digby.
Church Point.....	do
Comeauville.....	do
Chegoggin.....	Yarmouth.
Chester.....	Lunenburg.
Devils Island.....	Halifax.
Digby.....	Digby.
Ecum Secum.....	Guysboro.
Eskasoni.....	Cape Breton.
Gabarus.....	do
Georgeville.....	Antigonish.
Grand Etang.....	Inverness.
Great Village.....	Colchester.

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Half Island Cove.....	Guysboro.
Halls Harbour.....	Kings.
Harbourville.....	do
Irish Cove.....	Cape Breton.
Isaacs Harbour.....	Guysboro.
Jamesville.....	Victoria.
Kelleys Cove.....	Yarmouth.
Little Brook.....	Digby.
Little Narrows.....	Victoria.
Livingstone Cove.....	Antigonish.
Lunenburg.....	Lunenburg.
Malignant Cove.....	Antigonish.
Margaree Harbour.....	Inverness.
Margaret Island.....	do
Meat Cove.....	Victoria.
Monks Head.....	Antigonish.
Maitland.....	Hants.
Morden.....	Kings.
Mill Creek.....	do
Meteghan.....	Digby.
Meteghan River.....	do
McNairs Cove.....	Antigonish.
New Harbour.....	Guysboro.
Noel.....	Hants.
Oyster Pond.....	Antigonish.
Ogilvie's.....	Kings.
Parrsboro Pier.....	Cumberland.
Parrsboro (New Wharf).....	do
Pereaux.....	Kings.
Pictou Bar.....	Pictou.
Plaster Mines.....	Victoria.
Pickets.....	Kings.
Parkers Cove.....	Annapolis.
Plympton.....	Digby.
Port George.....	Annapolis.
Port Lorne.....	do
Port Maitland.....	Yarmouth.
Ragged Pond.....	Guysboro.
River John.....	Pictou.
Ross' Wharf (Englishtown).....	Victoria.
Scotts Bay.....	Kings.
Salmon River.....	Digby.
Saulnierville.....	do
Sandford.....	Yarmouth.
Saw Pit.....	Lunenburg.
Sheet Harbour.....	Halifax.
Somerville.....	Hants.
do.....	Annapolis.
Spindlers Cove (Cross Island).....	Lunenburg.
Sydney River.....	Cape Breton.
Tatamagouche.....	Colchester.
Tancook.....	Lunenburg.
Tittle Passage.....	Guysboro.
Trout Cove.....	Digby.
Tracadie.....	Antigonish.
Victoria.....	Kings.

Walton.....	Hants.
West Pubnico.....	Yarmouth.
Windsor.....	Hants.
Wolfville.....	Kings.
Whitehaven Wharf.....	Guysboro.
do Canal.....	do
Yarmouth Bar.....	Yarmouth.
do Harbour.....	do
Youngs Landing.....	Lunenburg.

## NEW BRUNSWICK.

Anderson Hollow.....	Albert.
Bay du Vin.....	Northumberland.
Barker's Landing (Riv. St. John).....	Sunbury.
Belleisle Bay (Riv. St. John).....	Kings.
Black Brook.....	Northumberland.
Black River.....	St. John.
Buctouche.....	Kent.
Burnt Church.....	Northumberland.
Campbellton.....	Restigouche.
Cape Tormentine.....	Westmoreland.
Caraquet.....	Gloucester.
Chance Harbour.....	St. John.
Chatham.....	Northumberland.
Chipman (Riv. St. John).....	Kings.
Chockfish.....	Kent.
Clifton.....	Gloucester.
Cocagne.....	Kent.
Curley's Shoal (Riv. St. John).....	Kings.
Dalhousie.....	Restigouche.
Dipper Harbour.....	St. John.
Edgett's Landing.....	Albert.
Fort Dufferin.....	St. John.
Gardner's Creek.....	do
Gilbert's Shoal (Riv. St. John).....	York.
Grande Anse.....	Gloucester.
Grand Lake (Riv. St. John).....	Queens.
Grand River do.....	Madawaska.
Hartland do.....	Carleton.
Herring Cove.....	Albert.
Hopewell Cape.....	do
Hopewell Hill.....	do
Lameque.....	Gloucester.
L'Etang.....	Charlotte.
Letite.....	do
Main River.....	Kent.
Marysville.....	York.
Mispec.....	St. John.
Negropoint.....	do
Neguac.....	Northumberland.
Oak Point.....	Bonaventure. P. Q.
Oromocto (Riv. St. John).....	Sunbury.
Ox Island.....	do
Point du Chene.....	Westmoreland.
Point Wolfe.....	Albert.



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Quaco.....	St. John.
Quaco West.....	do
Rapid de femme (Riv. St. John).....	Victoria.
Richibucto.....	Kent.
St. Andrew.....	Charlotte.
St. Francis (Riv. St. John).....	Madawaska.
St. John Harbour.....	St. John.
St. Louis.....	Kent.
St. Nicholas River.....	do
Shippegan.....	Gloucester.
Southampton (Riv. St. John).....	York.
Springhill	do do
Tobique	do Victoria.
Tracadie.....	Gloucester.
Two Rivers.....	Albert.
Tynemouth Creek.....	St. John.
Upper Salmon River.....	Albert.
Wilsons Beach.....	Charlotte.
Windsor.....	Hants.

## QUEBEC.

River St. Lawrence (Crane Island).
“ “ “ (Hyd'c Survey) Montreal to Quebec.
“ “ “ “ “ Prescott to Kingston.

Coteau Landing, Nicolet River, Gatineau River, Petite Rivière St. François, St. André, St. Lambert, St. Mathias, Pointe à Côte, Bic, Rivière Blanche, Lake Témiscouata, Graces Point, Rimouski.

## ONTARIO.

Burlington Channel.—	Examination, plan and report on proposed repairs to piers.
Collingwood.....	Examination, plan and report on a proposed channel to Meat Packing Co's wharfs.
Gordon Bay.....	Muskoka lake, St. Joseph, survey, plan and estimate for a wharf.
Hailebury.....	Examination and survey, with plan and estimate for a wharf.
Kettle Point.....	Survey, examination with report, plan and estimate for construction of a wharf.
Lake Muskoka.....	Examination with plan and report on extension of wharf.
Midland.....	Survey, examination, with plan and report for deepening harbour in front of Canada Iron and Furnace Company's wharfs.
Niagara River.....	Location of wharfs ; plan and report.
Port Elgin.....	Examination for extension of breakwater, plan and report.
Port Stanley.....	Survey and examination with plan, report and estimate to divert river.
Portsmouth.....	Examination, and estimate for repairs to pier, &c.
Rondeau.....	Survey, examination with plan and estimate for dredging harbour.
St. Joseph's.....	Survey, examination, with report, plan and estimate for a wharf.
Saugeen River.....	Examination, plan and estimate to repair north pier.
Severn River.....	Sparrow Lake, survey and examination for lowering water to decrease and prevent floods, plan, report and estimate of cost.

## NOVA SCOTIA.

## ABERCOMBIE.

Abercombie Point, is in Pictou County, N. S., on the south side of Pictou harbour, between the entrances to the East and Middle Rivers, and nearly opposite the town of Pictou.

A wharf was built at this place in 1889 by the Harbour Commissioners, to take the place of an old ferry wharf. It is a block and span structure 666½ feet in length and 21 feet in width, with a T head, on flats dry at extreme low water to within 167 feet of the outer end. The depth at the outer end at extreme high water is 2 feet. Spring tides rise 6 feet, neaps rise 4 feet.

When taken in charge by the department, it consisted of 14 blocks (two being in the T head), roughly constructed of round spruce or hemlock timber, 9 inches in diameter at the small end, and only partially ballasted. The blocks are from 21 to 24 feet in length on line of work, and from 13½ to 21 feet apart. Three of them near the inner end had been moved out of place, and had a great deal of unsound timber in them. There were floor stringers over the blocks, and openings from the fifth block to the outer end, but no covering.

During the year ended 30th June, 1892, the sum of \$864.22 was expended in repairs and renewals, viz., a brush and stone approach 41 feet in length and 4 feet in height was built. The inner block was reconstructed, and the 2nd and 4th blocks from the inner end were placed in position and repaired. Five stringers were placed from the inner end to the 5th block and one central stringer from this to the outer end. The whole of the block and span work was covered with 3-inch plank and provided with guard rails. A small quantity of ballast was placed in 3 of the inner blocks and the ballast was adjusted in some of the other blocks. A small slip was made between the two blocks forming the T head and 12 piles were driven against the outer face of these blocks. Fifty feet out from the head of the work, 3 piles were driven together on each side of the approach to the slip.

No important works of repair were made since 1892.

Total expenditure to 30th June, 1900, is \$864.22.

## ARCADIA.

Arcadia, Yarmouth County, is a thrifty farming village of about 400 people, situated at the head of the Chebogue River and harbour, about three miles east of Yarmouth. The river, though very narrow at the village, widens out immediately below, and is navigable for small schooners right up to the village; the channel however, is only navigable at high water, and is excessively crooked. To facilitate the approach of schooners, and the shipping and landing of small quantities of coal and general merchandise, the Department, in 1899-1900, spent the sum of \$696.34, in digging away by hand two or three projecting points in the channel, and in blasting and removing a number of large boulders that obstructed the entrance of schooners. The work is of considerable benefit to the trade of the place.

Total expenditure to 30th June, 1900, is \$696.34.

## ARISAIG.

Arisaig, Antigonish county, is on the Northumberland Strait, 15 miles to the eastward of Merigomish, the nearest harbour.

The works at this place consists of a pier, built by the provincial government prior to confederation, which came under the charge of the federal government in 1870; and a breakwater constructed in 1896-8.

The breakwater is 300 feet in length and 20 feet wide on top, with an L at

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the outer end 40 feet in length. The depth of water at its outer end, at low water springs, is 5 feet.

The pier originally consisted of an approach 245 feet in length, and an outer portion 174 feet long varying from 40 to 44 feet in width. Repairs and improvements have been made from time to time, including the construction during 1889-91 of an extension 100 feet in length. In 1896-7-8, the outer end of the seaward face of the pier was strengthened and a block 24 x 24 feet on top was placed on the seaward side of the outer end, to strengthen the face-work and to secure and retain a proposed extension of the stone talus, in which some 250 cubic yards of large stone were placed.

The total expenditure up to and including the fiscal year 1897-8 was \$30,697.73. Of this \$27,913.39 was expended in the construction and maintenance of the pier and breakwater, including a refund of \$541.41 made in 1887 to the Nova Scotia government and \$2,784.34 in dredging.

During the fiscal year 1898-9 the sum of \$599.82 was expended in completing the stone talus on the seaward side of the pier by placing 482 cubic yards of large stone, and in renewing 58 superficial feet of 5 inch plank and three fenders.

The depth of water at the outer end of the pier, at low water springs, is 10 feet. Spring tides rise 5 feet.

Total expenditure to 30th June, 1900, including refund of \$541.41 to Provincial Government and about \$6,500 for dredging, \$33,736.88.

## ASPY BAY.

Aspy Bay, Victoria County, is near the northern extremity of Cape Breton Island between White Point and Cape North.

At the head of the bay there are three extensive sheets of water, known as the North, Middle and South Aspy ponds, or harbours, inclosed by a beach of sand  $4\frac{1}{2}$  miles in length. The entrances to these ponds are shoal and intricate, the best being that of the North Aspy pond.

During the fiscal year 1891-92, the sum of \$200 was expended in repairs to a small wharf on the west side of the North harbour.

The wharf is a lightly constructed block and spau structure, 11 feet wide, extending 107 feet to a depth of 8 feet 8 inches at low water. It is the joint property of Zephirin Charron and Ronald McIssac, by whom an agreement was signed, permitting the public the use of it free of charge or hindrance. The road leading from the wharf to the highway is free to the public.

The wharf was strengthened and improved by the addition of 59 fenders, 4 mooring posts, 218 lineal feet of cap timber and 2 ring bolts. The outer block was levelled up, and it and the central block were partially ballasted.

No important repairs have been made since 1892.

Total expenditure to 30th June, 1900, is \$1,482.55.

## AVONPORT.

Avonport, King's County, is a small farming village with a population of about 250, situated at the mouth of the Avon River (at this point nearly two miles wide) and on the Dominion Atlantic Ry. 12 miles N. W. from Windsor the county town of Hants, and 13 miles E. from Kentville the county town of King's. Some two or three millions of bricks are made here during the year.

A small wharf of ordinary round log, stone filled cribwork was built here before Confederation by the inhabitants, aided by the Provincial Government. It is 300 feet long, 22 to 25 feet wide on top, and 17 feet high at the outer end which is dry at L. W. O. S. T. In 1886 the department having assumed control of the wharf some little time previously, spent \$1,200 in extensive general repairs.

During the year 1896-97 the sum of \$500 was expended in rebuilding the top of the shoreward half of the work, the covering, floor stringers, and upper two or three logs in height being renewed. The outer end is still in a dilapidated condition, but the wharf is now in better condition than it has been for some years, and shipments can be made from it.

Total expenditure to 30th June, 1900, including refund of \$816.00 paid Provincial Government, \$1,899.75.

This work was transferred to control of Department of Marine & Fisheries on 12th June, 1888.

#### BABIN'S COVE.

Babin's Cove, Richmond County, is on the northern side of Arichat Harbour, Isle Madame, and nearly opposite its western entrance.

In December, 1893, a contract was entered into for the construction of a wharf at this place for winter service, which included the grading of a road and rock cutting 410 feet in length; an embankment of stone 12 feet in length; and a block and span structure consisting of an inner block 20 by 20 feet on top, and an outer one 25 by 40 feet on top, with an opening or span of seventeen and one-half feet.

At the close of the year 1893-94 the road embankment and rock cutting were about one-half completed; the stone embankment was finished, and the inner block was in place, and built up to half tide and ballasted.

During the fiscal year 1894-95, the work under contract was completed.

The depth at the outer end of the wharf at extreme low water is 11 feet. Spring tides rise 5 feet.

No important repairs have been made since 1895.

Total expenditure to 30th June 1900 is \$3,155.04.

This wharf was transferred to control of Department of Marine & Fisheries on 29th March, 1897.

#### BARRINGTON.

Barrington, Shelburne county, is distant 45 miles to the south-east of Yarmouth, and 30 miles south-west from the town of Shelburne, and is within 10 miles of Cape Sable; the most southerly point of Nova Scotia. The settlement is a straggling one and covers a distance of about 3 miles; the upper part being known as "the Head," and the lower the "Passage." It is a port of call for the line of steamers running between Halifax and Yarmouth, and is the terminus of the steam ferry to Cape Sable Island.

There being no wharfs in the district having a greater depth than 2 or 3 feet at their outer ends at low water, and the need of greater shipping facilities being much felt, the department began the construction of the present wharf in 1888-9, completing it in 1890-1, at the cost of \$7,410.97.

This wharf extends over mud flats, bare at low water to Sherrow's Channel (so-called), and is 944 feet long, 20 feet wide and has 12 feet of water at its outer end at low water ordinary spring tides. The seaward end for 138 feet is built of round log, stone filled cribwork, all the remaining portion of the work being of pile bents. There is a gradual rise in the floor from the shore to the end of 3½ feet where the top of the planking is 6 feet above high water ordinary spring tides. At the outer end there is an L, 32 feet wide and with a face length of 72 feet on the channel, on which stands a freight shed 35 feet by 20 feet and a drop landing.

In the fiscal year 1892-3, the sum of \$673.56 was expended in constructing a triangular piece of pile wharfing, to fill up the angle between the L and the main portion of the work; the object being to afford more accommodation for the landing of goods as well as for the movement of trucks and teams. The total cost of construction was thus increased to \$8,084.53.

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In 1888-9-90-2 a further sum of \$8,105.38 was applied in dredging a basin at the wharf, improving the approach to the same in Sherrow's Channel by removing points and deepening the channel to 11 feet, also opening a literal passage from the main channel to Sargent's wharf.

During the fiscal year 1898-9 the sum of \$398.79 was expended in repairing portions of the wharf. Thirty piles were replaced at the south-west corner and new planks, stringers and guard rails put on where found absolutely necessary. The piles were driven 15 feet in the mud, secured to the old piles, and to the new stringers with screw bolts besides being well braced, and walings were placed along the whole of them.

Total expenditure to 30th June, 1900, is \$21,352.90.

This work was transferred to control of Department of Marine and Fisheries on 5th August, 1891.

## BASS POND.

Bass Pond, (Irving Pond on the chart) Antigonish Co., on the west side of the Strait of Canso near its northern entrance, is a deep water pond half a mile in length and a quarter of a mile in width.

During the year the amount appropriated for expenditure in 1899-1900, (viz. \$650.-) was expended in opening a channel for boats through the beach separating the pond from the Strait, and in closing an outlet into Auld's Cove at its northern extremity.

A cutting 40 feet in width at the bottom and 190 feet in length, was made down to from 2 feet at the outer and to 1 foot at the inner end, below the level of low water outside. The stones and boulders removed in making the cutting were utilized in constructing a stone wall on each side 35 feet from the centre line extending in, 145 feet from low water outside.

## BASS RIVER.

Bass River, Colchester County, is a thriving farming and manufacturing village of some 500 people, situated on the north side of Cobequid Bay, the eastern arm of the Bay of Fundy. It is halfway between Truro and Parrsboro', or about 28 miles from each place.

In December, 1894, a contract was awarded to Mr. John McMillan, of Port Hood, C. B., for the construction of a pile wharf, for the purpose of shipping lumber and landing general merchandise, at a cost of \$2,840. It was finished in August 1895. The work is 210 feet long and 40 feet wide, with an L at the outer end 55 feet long and 40 feet wide. At the outer end of the L it was found necessary to build a small block of cribwork containing 8,000 cubic feet, on account of the hard nature of the bottom preventing the piles from being driven to a proper depth. This was built at a cost of \$400.00.

Total expenditure to 30th June, 1900, is \$3,549.34.

This wharf was transferred to control of Department of Marine and Fisheries on 18th November, 1897.

## BATTY ISLAND.

Batty Island, Pictou County, is situated in Merigomish Harbour, near the entrance. Its length is  $1\frac{1}{2}$  miles and its greatest width half a mile, and its southern shore is distant from the mainland about three-quarters of a mile, and is sheltered from all outside winds.

During the year 1889, a small wharf was constructed on the south side of the Island. It extends 60 feet to flats covered only with a few inches at extreme low water, is 12 feet in width, and consists of two blocks, each 15 feet by 12 feet,

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with openings of 15 feet. Spring tides rise 5 feet 3 inches; neaps rise 3 feet 3 inches.

No important repairs were made on this wharf since 1889.

Total expenditure to 30th June, 1900, is \$499 80.

#### BAYFIELD HARBOUR.

Bayfield, Antigonish County, is on the south shore of St. George's Bay, 8 miles east of Antigonish Harbour and 15 miles west from the entrance to the Straits of Canso. The harbour or roadstead is sheltered by Pomquet Island, lying 1,900 feet to the eastward of Pomquet Point, and by outlying reefs, from all directions, excepting between north-east by north and west.

A breakwater 400 feet in length was constructed at Pomquet Point in 1879, and extended 310 feet in 1888. The work consisted of a crib core 18 feet in average width, covered with stone sloping on the seaward side three to one, and on the inner side one and one-half to one. It continued undisturbed until the occurrence of the great gale of 1st December, 1890, when the stone covering was stripped off nearly to high water level, to within 160 feet of the inner end.

During the years 1892-93, 1893-94 and 1895-96 the breakwater was repaired and extended. The work done included an extension 70 feet in length with an L or return at the outer end 40 feet in length.

During the fiscal year 1897-98, the sum of \$999.73 was expended in reconstructing the stone covering of the breakwater in places where it had been disturbed. About 4,000 superficial feet of surface was reconstructed with 263 cubic yards of large stone, 163 cubic yards of which was old stone displaced and 200 cubic yards of new stone brought one mile to the public wharf, thence by scow a quarter of a mile to the breakwater.

Total expenditure to 30th June, 1900, including refund of \$4,244.24 to Provincial Government and dredging, \$36,701.83.

#### BAYFIELD WHARF.

In 1857, the construction of a wharf was commenced by a joint stock company on the west side of the harbour, a quarter of a mile south from Pomquet Point. It was handed over to the provincial government and completed in 1873. When it came under the charge of the Federal Government in 1887, it was a block and span structure 402 feet in length, extending to 9 feet at extreme low water. In 1887-88 the two outer and adjoining blocks were raised, repaired and close piled; the central block and the shore block were cut down to low water; and a continuous work was constructed between the outer blocks and the shore.

By the great gale of the 1st December, 1890, the work was carried away down to from 6 feet below low water at the outer end, to 3 feet above low water 112 feet from the inner end.

In 1892-93 a contract was entered into for the construction of a new wharf. The work under contract was completed, and the approach to it was improved by one of the departmental dredges, in 1893-94.

The new wharf is 442 feet in length, including 33 feet of rubble masonry, 319 feet of block and span open-faced cribwork 25 feet wide, and 90 feet of close-faced cribwork in two blocks each 60 by 30 feet, placed at right angles. The substructure of the open-faced cribwork and of the outer close-faced cribwork is of creosoted North Carolina yellow pine, and the superstructure of native timber. The depth at extreme low water at the outer end is 11 feet. Spring tides rise 4 feet.

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Since its completion the blocks of both open and closed-faced work have settled considerably, principally on the northern side.

In May and June, 1896, the sum of \$348.37 was expended in levelling up 127 feet of the block and span work and in slight repairs to the covering between the two outer close-faced blocks.

Total expenditure to 30th June, 1900, \$26,274.18.

This wharf was transferred to control of Department of Marine & Fisheries on 12th June, 1888.

## BAY ST. LAWRENCE.

Bay St. Lawrence, Victoria County, is at the northern extremity of Cape Breton Island, between Capes North and St. Lawrence.

Near the head of the bay there is a small lake enclosed by a beach of sand and gravel.

In 1887 a channel was opened through the beach to admit of the passage of boats at high water. Shortly after its completion it was filled in from the outside, over a distance of about 100 feet, and during 1888-89 the channel, which had been alternately opened during freshets and closed during northerly gales, was re-opened and protected by a pier extending 53 feet beyond high water and by a work of brush and stone, 30 feet in length, inside of it.

The channel remained open for a while after the completion of the protection work, but is now closed by a short bar opposite the inner end of the pier.

This shoaling is due to the travel of sand and gravel across the beach, inside the protection work, during northerly gales.

Spring tides rise, 4 feet.

No important repairs have been made since 1889.

Total expenditure to 30th June, 1900, is \$3,992.17.

## BEAVER RIVER.

Beaver River is a prosperous fishing and farming village of some 400 people, situated on the coast of St. Mary's Bay, 13 miles north of Yarmouth, on the county line between Digby and Yarmouth. The little stream of the same name which issues here, discharges through a gravel beach, which formerly, when the stream was low, obstructed the mouth and ultimately closed it altogether so that the water had to find an exit by soakage through the gravel. In the year 1886-87 operations were begun by the Department to improve the river mouth, and to remedy this defect. A passage was cut through the gravel bank and sea wall, and a short breakwater was built on the south side of the mouth to catch the gravel and prevent the bank reforming. The expenditure this year was \$1,000. This work proving satisfactory, the sum of \$1,500 was expended by the Department in 1888-89 in further improvement: this consisted of extending the breakwater 100 feet, sheet piling the northern face of the same, which was exposed to the action of the river and was in danger of being undermined, and extending the short pier on the northern side of the mouth, it being found that storms from the north at times threw in a considerable quantity of gravel and made it difficult for fishing boats to enter. The breakwater on the south side, besides protecting the river mouth, forms a good though short loading pier for vessels during the summer months. In 1891-92 the rush of water during the freshets having begun to undermine the work, the sum of \$450 was expended in close piling a portion of the river face of the work, and in levelling up and repairing the top, which was leaning over into the stream. In 1899-1900 the sum of \$732.35 was expended

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in rebuilding the whole top of the work for a height of from 3 to 5 feet, new fenders being also placed around the whole block ; the appropriation being \$1,000, the unexpended balance is \$267.65.

Total expenditure to 30th June, 1900, \$2,697.26.

#### BELLIVEAU'S COVE.

Belliveau's Cove, Digby County, is situated on the eastern shore of St. Mary's Bay, about 4 miles south-west of Weymouth. It has a population of from 200 to 300 people, and is one of the most important shipping and fishing ports on the coast of Digby County. The harbour, which is dry at low water, is formed by two piers or breakwaters, the northern built in 1825, and the southern in 1853, both at the joint expense of the inhabitants and the Provincial Government. They are built of round log, stone-filled cribwork of the usual type, and they enclose an area of about three acres, over the greater part of which is a depth of 12 feet of water at H. W. O. S. T. In 1878 the department expended the sum of \$3,000.00 in putting this structure in proper repair, and in the construction of an additional length to the northern pier. In 1892-93 a further sum of \$500.00 was expended in repairs to the south breakwater, the work done consisting of the rebuilding of the top of the work for a length of 360 feet and to a depth of from 3 to 6 feet ; the placing of 4 tiers of new timbers on the inner, and 2 and 3 tiers on the outer face, with new cross-ties every ten feet ; 82 fender piles were driven along the inner and 16 along the outer face ; 8 mooring posts were placed, and the whole filled up with ballast and levelled with earth and gravel. The northern breakwater is 500 feet long with an ell on the outer end 70 feet long ; it is from 20 to 35 feet wide on top, and 17 feet high along the outer face of the ell, where, at H. W. O. S. T., there is 13 feet of water. The southern breakwater is 350 feet long with an ell on the outer end 35 feet long ; it is from 20 to 35 feet wide and 16 feet high along the outer face of the work, where, at H. W. O. S. T., there is about 12 feet of water. Spring tides rise 22 feet, neaps 18 feet. In 1895-96 the sum of \$500 was expended in taking down and rebuilding the inner or south side of the shoreward end of the north breakwater 150 feet long, 10 to 14 feet wide, and 12 feet high, and a portion also on the north or outer side 40 feet long and 5 feet high. In 1898-99 the sum of \$1,999.93 was expended in rebuilding 280 feet in length of the middle portion of the northern breakwater from 8 to 14 feet in height, the new work adjoining that built in 1895-96. In the fiscal year 1899-1900 the sum of \$1,996.47 was expended in extensive repairs and renewals to both breakwaters as follows : on the north breakwater the outer 60 feet in length of the main work was taken down and rebuilt six logs high, the whole of the L being rebuilt two logs high and thoroughly ballasted. New sills and bed pieces were also placed beneath the lighthouse standing on the end of the breakwater ; in the angle at the north end the work was faced with a new piece of cribwork 65 ft. long, 10 ft. wide and from 6 to 9 feet high. Along the whole north side, or for a length of 380 feet, a new break  $4\frac{1}{2}$  feet high of two inch hemlock plank, was built to keep the spray from flying over the work. On the south breakwater the shoreward end of the north side was taken down and rebuilt 205 ft. long, 10 ft. wide, and from 6 to 8 ft. high. The outer north corner was rebuilt from the ground, the new pieces being 40 ft. x 40 ft. x 16 feet high. Seven new mooring posts were also placed in position.

These two breakwaters are now in good condition, and will want no further repairs for several years.

Total expenditure to June 30th, 1900, including re-fund of \$1,120.52 to Provincial Government, \$9,115.57.

This work was transferred to control of Department of Marine and Fisheries on 12th June, 1888.



## BIG BRAS D'OR.

Big Bras d'Or, Victoria county, is on the south side of the channel of the same name, near the entrance into the Atlantic Ocean.

With a view of enabling the residents of this locality to avail themselves of the advantages to be derived from the steamers which ply between Sydney and the terminus of the Intercolonial Railway at Port Mulgrave on the Strait of Canso, a public wharf has been built in Livingston's Cove situated on the northern side of Boularderie Island four miles from its head and opposite Kelly's Cove on the north side of the Big Bras d'Or Passage, here a mile in width.

Boularderie Island lies as it were at the northern end of Bras d'Or Lake, Cape Breton, between it and the Atlantic, and the channel on its northern side is the only one now navigable by steamers and sailing craft; the channel on its southern side, which is narrow and of intricate navigation, being practically closed by a highway bridge.

The wharf at this place was completed in 1888-9. It is a block and span structure 150 feet in length, consisting of a shore block 40 feet in length by 20 feet, and an outer block or head 60 feet in length, along the channel face, by 20 feet.

The depth at the outer end at extreme low water is 11 feet. Spring tides rise 2.

The sum of \$3,299.98 was expended in construction. There was no further expenditure up to the end of the fiscal year 1897-8.

The sum of \$20.43 was expended in September, 1898, in temporary repairs to the covering to render the wharf safe for traffic during the season.

Total expenditure to 30th. June 1900, is \$3,320 41.

## BIRCH HILL COVE.

Birch Hill Cove, Antigonish Co., is on the Northumberland Strait, a mile and a quarter to the eastward of Arisaig.

During the fiscal year 1899-1900, the sum of \$299.88 was expended in removing some dangerous boulders at the entrance to the Cove, and in improving the landing over a distance of about 120 feet by blasting and removing portions of the ledge rock.

About 70 cubic yds. of boulders and ledge rock were removed; of which 40 cubic yds. were above, and 30 cubic yds. below low water. The material was deposited between the ledges on the western side of the Cove; thus increasing the protection during westerly winds.

## BLACK ROCK.

Black Rock, Victoria Co., is a fishing station on that part of the East or Atlantic coast of Cape Breton Island, known as "the North Shore," and nearly midway between the harbours of St. Ann and South Ingonish.

During the year, the sum of \$500 was expended in reconstructing and protecting a road leading from the landing place on the beach to the top of a clay bank. The road was reconstructed for the convenience of the fishermen whose fish-houses are on top of the bank, and to give them a place on which to haul up their boats during the rough weather.

The new road is 8 feet in width, benched in the face of the bank, and rising, from 5 feet above high water at the beach to the top of the bank 75 feet above high water, in a distance of 300 feet. The lower end of the road is protected by stone retaining walls for a distance of 25 feet; and the top of the slope by a rough work of brush and stone 80 feet in length.

## BLANCHE HARBOUR.

Blauche is a small scattered fishing peninsula of about 130 people situated on the southern extremity of the peninsula forming the western side of Negro Harbour, about 18 miles nearly due south of Shelburne, the county town.

The only harbour for fishing boats in the neighbourhood is a small tidal pond, nearly dry at L. W. O. S. T. with a narrow and exposed channel leading into it, and an area at H. W. O. S. T. of some two or three acres. The sides of the entrance channel being composed of fine gravel constantly shifting under the action of the waves, it became necessary, for the permanence of the harbour to protect it, and in 1892, the department built a groyne 72 feet, in length, on its eastern or exposed side.

During the year 1895 the sum of \$300 was expended in building an extension to this groyne 50 feet in length.

The work is 10 feet wide on top and about 7 feet high, built of round crib-work and filled with ballast.

No important repairs have been made since 1895.

Total expenditure to 30th, June, 1900, is \$299.76.

## BLUE ROCK.

Blue Rock, Antigonish Co., is situated on the southern coast of St. George's Bay, about  $2\frac{1}{2}$  miles to the eastward of the entrance into Tracadie Harbor, and 6 miles to the westward of the northern entrance into the Gut of Canso.

A breakwater, extending 316 feet in a south-westerly direction from Blue Cape, for the protection of a boat-landing and to make a shelter for fishing boats, was commenced by the Department in 1886 and completed in 1889. It is from  $16\frac{1}{2}$  to 17 feet wide on top, with a sloping face on the seaward side, sloping 1 to 1, from the top of the work to one foot below high water. It was strongly constructed with faces of squared native timber and fully ballasted. The depth at the outer end, at low water springs, was 12 feet, and over the area sheltered from the north and east, from 11 to 5 feet. Spring tides rise 4 feet.

The face-timbers below the line of low water, having become weakened, and in places destroyed by the teredo, and the ballast in the work having settled, during 1892-93-94, the work was re-ballasted where necessary, the outer end and seaward face, and for a distance of 15 feet on the inside face, the work was close-fendered and stone protection was placed along the seaward face, the outer end and on 40 feet of the inside face, sloping  $1\frac{1}{2}$  to 1 from one foot below high water mark, on the seaward face and outer end, and 1 to 1 from high water mark on the inside face.

During the year 1899-1900 the sum of \$391.28 was expended in reballasting and placing new floor stringers, covering and cap-timbers for a distance of 50 feet at the outer end, in placing new timbers in the sloping face where required, in sheathing 54 feet of the sloping face and in placing additional stone in the talus on the seaward side.

Total expenditure to 30th June, 1900, is \$10,064.49.

## BOULARDERIE (NORTH SIDE).

Boularderie, Cape Breton, is on the north side of Boularderie Island, Great Bras d'Or, and 12 miles south-east from Baddeck.

A public wharf, 134 feet in length, 20 feet wide, with a head 50 by 20 feet has been built at this place. It has an average depth of 13 feet at its outer end, and will, when the grading of the approach is completed, be of great benefit to the residents of the north side of the island.

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Total expenditure to 30th June, 1900, is \$2,000.00.

This wharf was transferred to control of Department of Marine and Fisheries in November 1897.

## BOULARDERIE (ROSS FERRY)

Ross Ferry Landing, Victoria county, is on the northern side of Boularderie Island, 13 miles to the westward of the principal entrance to the Great Bras d'Or Lake. The public wharf built in 1884-85, a mile and a quarter to the eastward of Ross Ferry Landing having fallen out of repair, a new wharf was constructed in 1895-96 and 1896-97 about midway between the old wharf and the ferry landing.

During the fiscal year 1897-98 the sum of \$499.97 was expended in constructing a road from the wharf to the highway, a distance of about 320 feet; and \$25 in repairing and strengthening the corners of the wharf.

Total expenditure to 30th June, 1900, is \$3,730.54.

## BROAD COVE MARSH

Broad Cove Marsh, Inverness county, is on the Gulf of St. Lawrence, 12 miles to the southward of Margaree Harbour.

A wharf, 400 feet in length, constructed in 1888, was seriously damaged in 1893 and 1894, being subsequently carried away to within 207 feet of the inner end. In 1894-95 the inner 207 feet was reconstructed and protected by close fendering.

The reconstructed work was examined on the 17th December, 1897, when it was found that ballast, for a length of 56 feet had gone out of the face-chambers on the seaward side, through openings at the bottom.

During the months of December, 1897, and January, March and April, 1898, the sum of \$199.84 was expended in reballasting the empty face-chambers, raising the outer seaward corner one foot 6 inches and in renewing floor stringers and cap timbers.

Total expenditure to 30th June, 1900, including refund of \$1,000 paid to Provincial Government, \$19,795.25.

This work was transferred to control of Department of Marine & Fisheries on 26th February 1890.

## BRULÉ

Brulé is a scattered settlement of about 500 people situated in the north-west corner of Colchester County, on the shore of Northumberland Strait. It is about midway between River John to the east and Tatamagouche to the west, being five miles from the former and seven from the latter, and it is about a mile to the north of Denmark Road station on the Oxford and New Glasgow loop of the I. C. R. Some few years before Confederation a public wharf was built at the joint expense of the Government of Nova Scotia and P. E. Island, and the inhabitants, the respective amounts contributed, it is said, being \$1,200, \$800 and \$400. Prior to 1884 the Department had spent \$500, in occasional repairs; in 1886 the sum of \$500 was spent in general repairs; in 1888 a further sum of \$542.09 in repairing damage done by ice and heavy seas, and in protecting the outer end of the work with close piling, which was carried to a distance of 30 feet on each side shoreward from the outer end. In 1891 a further sum of \$626.57 was expended in general repairs, the work done being for the most part necessary to replace a portion of the top of the structure and make good other minor damage caused by an exceptionally high tide and heavy sea on September 1st, 1890. The outer end is 366 feet long, 24 feet wide and 14 feet high at the outer end, where at

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L. W. O. S. T. there is a depth of 3 ft. of water. It is built wholly of round log cribwork, the cap, top face timbers and floor stringers only being of square timber. The shoreward half of the top of the work is gravel on top of the bal-last, the outer half is plank. Spring tides rise 8 feet, neaps  $6\frac{1}{2}$  ft. During the fiscal year 1899-1900 the sum of \$1,097.73 was expended in renewing the whole top of the wharf for a height of 2 to 5 ft. and placing new fenders and mooring posts all around.

Total expenditure to 30th June, 1900, including refund to Provincial Govern-ment, \$3,824.06.

This work was transferred to control of Marine & Fisheries on 12th June, 1888.

#### BURYING ISLAND (CANSO).

Canso Harbor, Guysborough Co., is a place of much historical as well as nautical interest. It was visited by French fishermen and fur traders as early as the 16th century. In 1578, the number of fishing vessels on the coast was 330, of which 150 were French, 130 Spaniards and Biscayans, and 50 English. During the next two hundred years it was the scene of frequent conflicts between the French and British colonists and the Indians, falling alternately under the power of France and England until 1759, when the contest was finally terminated. The remains of a large fort which commanded the approach from the Atlantic may still be seen on Grassey Island.

Canso lies at the southern entrance of Chedabucto Bay through which all vessels entering or leaving the Gulf of St. Lawrence by the Gut of Canso must pass, and near the point where the general trend of the coast of Nova Scotia changes from south to west.

It has two entrances—the northern leading from Chedabucto Bay and the southern from the Atlantic. There is also a narrow boat channel called the "Tickle" between Durell Island and the mainland. Many vessels pass through the harbour in order to avoid going round the dangerous rocks and ledges which lie outside of it. It is also much frequented by Canadian and American fishing vessels which run in here for shelter or to await a change of wind. The cod and lobster fisheries are followed extensively in the vicinity.

The harbour is formed by Piscatiqui, George and Grassey Islands on the east, and by Durell Island and the mainland on the west. Cutler Island and the shoals between it and Durell Island protect it from the north, and Burying Island and the bar uniting it with Lanigan Point from the south-east.

The clay banks of Burying Island have been gradually wasting away until only a very small portion of it remains above high water. Its destruction would have transformed it into a dangerous reef, and have left the harbor exposed to the swell from the Atlantic. It became necessary therefore to protect the remains of the island by a breakwater. This work was begun in 1880 and finished in 1882. It is 290 feet long and formed of strongly framed crib-work packed with stone and protected on the ends and seaward side by slopes of heavy stone. Its cost has been \$9,000. Spring tides rise  $6\frac{1}{2}$  feet, and neaps,  $4\frac{1}{2}$  feet.

No important repairs have been made since 1882.

Total expenditure to 30th June, 1900, is \$9,000 00.

#### CANADA CREEK.

Canada Creek, also called Black Rock, is a small fishing and farming settle-ment of about 150 people, situated on the south shore of the Bay of Fundy, 60 miles east of Digby Gut, 8 miles west of Hall's Harbour and nearly opposite Cape d'Or on the Cumberland Coast. The harbour, which is dry at low water (spring tides rise 39 feet, neaps 33 feet) is formed by two piers or breakwaters built on either side of the mouth of a small stream; that on the eastern side,

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which is entirely detached from the shore, serves, merely as a breakwater, and was built by the Department in 1878-79 at a cost of \$3,000. It is 150 feet long, 25 feet wide on top and from 12 to 15 feet high, built throughout in a substantial manner of square timber, close faced cribwork, well ballasted and floored with 3-inch plank. The work on the western side, originally 248 feet long and serving both as a breakwater and loading pier, was built many years ago at the joint expense of the inhabitants and the Provincial Government. It is constructed of round log cribwork, and the seaward face is protected by a close sheathing of flatted spars. In 1874 it was extensively repaired by the Department at a cost of \$2,300. In 1884, having become very old and shaky, it was again repaired, and a new block, 57 feet long, by 10 feet wide, built on the eastern side of the shore end at a cost of \$750. In 1885 and 1886 the respective amounts of \$100 and \$650 were expended in necessary repairs. In the winter of 1889-90 the outer 100 feet in length of the work was completely wrecked, and other minor damage caused by severe gales. In the autumn of 1891 the sum of \$250 was spent in temporary repairs to save the work from further destruction. The shortening of the structure by the demolition of its outer end caused the gravel to wash round the breakwater, and fill up the berth for vessels in the bed of the stream on the eastern side. In June 1893 the Department built a new block of cribwork 50 feet long, 14 ft. wide on top and from 8 to 11 ft. high between the outer end of the existing work and the remains of the old. (This block together with the remains of the old structure lying beyond it, was totally destroyed in the great storm of November 12th and 13th, 1899.) In the fiscal year 1898-99 the sum of \$1,506.79 was expended in rebuilding the whole eastern face of the western breakwater, the new work being 235 ft. long, from 10 to 14 ft. wide and of an average height of 12 ft. The eastern breakwater was also sheathed on the outer end and 100 tons of new ballast placed in it. Several hundred tons of rocks and boulders were also removed from the Creek alongside the western breakwater, so that vessels could approach and lie at it more easily. In 1899-1900 the sum of \$607.88 was expended in rebuilding the lower two outside courses of longitudinal face logs and fenders along the eastern or shoreward side of the work, in close sheathing and fendering the outer end, and for purchasing the materials for the construction of a new outer block.

Total expenditure to 30th June, 1900, including refund of \$550.00 to Provincial Government, \$10,754.71.

This work was transferred to control of Department of Marine & Fisheries on the 12th June, 1888.

## CAPE SABLE ISLAND (DONALD'S HEAD).

Donald's Head, Shelburne County, is situated on the eastern side of Cape Sable Island, about six miles south of Barrington.

Some years ago the inhabitants built a small wharf or breakwater to protect the entrance to a small tidal pond forming a convenient shelter for a numerous fishing fleet.

In 1891-92 the department spent the sum of \$300 in putting the work in repair and building it up to its present height.

On the 16th December, 1892, a contract was entered into between the department and George Wilson, of Barrington, to build an extension to the present work, 90 feet long 18 feet wide and 14 feet high, of stone filled cribwork, at a cost of \$1,628 80. The work was satisfactorily completed in June, 1893.

In 1894 a sum of \$828.80 was expended.

Total expenditure to 30th June, 1900, is \$2,099.04.

## CAPE ST. MARY.

Cape St. Mary, Digby County, is the southern point of the entrance to St. Mary's Bay. It is one of the best fishing stations on the coast; cod, haddock, pollock and herrings being caught in abundance.

A breakwater now 310 feet long, was begun about 1846, and has been built in sections by the inhabitants, assisted from time to time by small grants from the Provincial Government, amounting in all to about \$1,200. From age and the action of the sea and ice, the work had become much delapidated. It was partially rebuilt in 1881-82 by the Department at a cost of \$2,000.

In 1883 these repairs were completed.

Repairs were made in 1895 at an expenditure of \$439.88.

Total expenditure to 30th June, 1900, is \$4,939.35.

## CARIBOU.

Caribou Island, Pictou County, is on the Nothumberland Strait, 5 miles to the westward of the entrance to Pictou Harbour. It is about 4 miles in length and half a mile in average width.

Caribou Harbour, sheltered by Caribou Island and a smaller island lying to the eastward of it, is an extensive place 6 miles in length and 1 mile in width, but the water is shallow.

The principal entrance between the two islands has only a depth of 4 feet at extreme low water, and the flats between the mainland and the western extremity of Caribou Island are dry at extreme low water, except in a few small channels. Spring tides rise 6 feet, neaps 4 feet. A causeway of brush and stone 1330 feet in length and 18 feet in width on top, between the mainland and the western extremity of the island, commenced in 1890-91 and continued in 1892-93 and 1893-94 remained in an unfinished condition, being covered in places at half tide.

During the fiscal year 1894-95 the sum of \$299.38 was expended in raising the work which is now up to about ordinary high water level over 560 feet of its length and about one and a half feet below that level over the remaining 770 feet.

Total expenditure to 30th June, 1900, is \$1,580.60.

## CHETICAMP.

Cheticamp, Inverness Co., is on the west coast of Cape Breton Island 18 miles north of Margaree. It is a secure harbour, being sheltered from the west and south by Cheticamp Island and a connecting beach. The entrance is from the north through a dredged channel.

A wharf built on the eastern side of the harbour in 1890 consisted of an approach 125 feet in length, and 30 feet in width over a distance of 60 feet from its outer end, with side walls and centre filling of stone, and an extension 80 feet in length in two blocks, a central block 20 x 20 feet, and an outer block or head 25 feet in width and 60 feet in length along the channel face, with openings of 17 feet 6 inches.

The expenditure up to the end of the fiscal year 1897-1898 amounted to \$5,240.83 of which \$5,190.75 was for construction.

In 1898-99 the sum of \$1,639.80 was expended in procuring the materials, including creosoted timber, required in the reconstruction of the extension, which had been weakened by the ravages of the teredo and had settled considerably.

During the fiscal year 1899-1900, the sum of \$977.41 was expended in reconstructing and enlarging the central block and in constructing a creosoted pile head

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over the outer block with materials procured in 1898-99, and an over expenditure of \$302.50 was incurred in improving the grade of the approach.

The extension, as reconstructed, is 90 feet in length including a central block 20 x 30 feet and a creosoted pile head 70 feet in length and from 33 to 37 feet in width, with openings of 18 and 16 feet. The depth at the outer end at low water is 13 feet. Spring tides rise  $3\frac{1}{2}$  feet.

Total expenditure to 30 June, 1900, on wharf is \$7,908.04 and on dredging \$43,925.51.

## CHEVRIE.

The village of Chevrie, with a population of about 350, is situated on the right or east bank of the estuary of the River Avon, where it debouches into the Basin of Minas, some fifteen miles north of Windsor, the county town. It is a good farming district, but the principal trade of the place is the quarrying and shipment of gypsum to the United States. The quantity, which varies according to the prices ruling in the American market, ranges from 20,000 to 60,000 tons per annum. A wharf about 100 feet long was built here many years ago by the Provincial Government. In 1873-74 the Department of Public Works lengthened it 70 feet at a cost of \$2,338.88 this extension being of open round log work like the old work. In 1882 a further extension of 183 feet was built at a cost of \$5,000. This piece of work is of square timber, close faced, 25 feet high and 25 ft. wide on top, the same width as the former, and the sides batter 1 to 12. In 1885 the sum of \$600, was expended in effecting some much needed repairs to the shoreward side of the wharf. In 1884 the department built a detached breakwater 300 feet distant from the outer end of the wharf for the purpose of protecting the latter from the sea to the northward, to which it was exposed. This piece of work consists of a solid piece of cribwork 130 feet long, 20 feet wide on top, 35 feet wide at the base, and about 23 feet high, built of square timber and close faced on all sides. The seaward side to a height of 10 feet below high water of spring tides has a slope of one to one, the sloping faces being covered with 6 inch plank. The block is provided with mooring posts to assist vessels in coming to a berth at the wharf as well as with ring bolts and ladders. In 1887-88 the sum of \$500.05 and in 1896-97 the sum of \$100, was expended in general repairs to the wharf. In the fiscal year 1899-1900 the sum of \$903.27 was expended in extensive repairs to the wharf. On the outer 100 feet in length the flooring, guards and some of the fenders were renewed; on the next 80 feet the guards and a few fenders were renewed; on the next 105 feet the work received new ties, stringers, guards, flooring and fenders; on the next 50 feet shoreward most of the flooring was renewed; 205 feet in length of the wharf, included in the above lengths, was raised in height from one to three feet. In all, 69 new fenders were placed, and 250 tons of new ballast was put in.

Total expenditure to 30th June, 1900, is \$19,486.39.

## CHEBOGUE.

Chebogue Town Point, Lunenburg County, with a population of about 400 people is one of the oldest settlements in the county of Yarmouth. It is situated on the west side of Chebogue River and harbour, about five miles south of Yarmouth. The wharf (which was the first wharf in Yarmouth County and, excepting Arcadia at the extreme head, is the only landing place on the river), was built about one hundred years ago by the Provincial Government. It was repaired and extended a length of 67 feet by the same Government, about the year 1883; receiving no repairs or renewals since the latter date, it fell into a state of dilapidation and disuse. In 1899-1900 the sum of \$856.74 was expended in renewing the works, with a pile structure on the site of the old. The new work is 110 feet in length, exclusive of the short earth and stone approach, from

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24 to 33 feet wide, and  $10\frac{1}{2}$  feet high at the outer end. At low water the mud flats are bare a couple of hundred feet beyond the wharf, while at high tide there is about 8 feet of water.

Total expenditure to 30th June, 1900, is \$856.74.

## CHEGOGGIN.

Chegoggin, Yarmouth county, is a small fishing and farming village, with a population of a couple of hundred, situated on the Bay of Fundy coast, about four miles north of Yarmouth. The little bay of the same name is one-third of a mile north and south, and about the same in width east and west, fully exposed to the south-west, and sheltered from other quarters; it is dry at low water and at high tide has a depth of 12 to 14 feet (springs with a rise of 16 and neaps 13 feet). In the winter of 1895-96 the inhabitants, aided by a grant of \$45 from the municipal council, built a small breakwater 80 feet long,  $12\frac{1}{2}$  feet in width and from 6 to 11 feet high, on the south side of the mouth of the stream outlet. The work was roughly built of round log cribwork, and filled with shingle and small boulders. Over half a century ago a breakwater was built here by the proprietors of the marsh, in a position immediately to the west of the present work. It was totally destroyed some 18 or 20 years ago, not a vestige of it being visible to-day. In 1899-1900 the sum of \$598.12 was expended in lengthening the breakwater by the addition of a new block 60 feet long, 15 feet wide and from 10 to 13 feet high. It is cheaply though substantially built of round log cribwork, of the ordinary type.

Total expenditure to 30th June, 1900, \$598.12.

## CHIPMAN BROOK.

This is a little settlement of about a dozen families engaged in fishing, farming and shipping of cordwood. The harbour at this place is formed by the mouth of a small stream issuing on the south shore of the Bay of Fundy half way between Hall's Harbour and Canada Creek, or about three miles distant from each place. The trade of the place, to an even greater extent than that of the numerous other similarly situated little ports on the shore of King's County, has, since the construction of the D. A. Railway dwindled to insignificant proportions. About the year 1857, a public wharf 175 feet long, 26 feet wide, was built at the joint expense of the inhabitants and the Provincial Government. Since the Public Works Department has had charge and control of the structure, numerous expenditures have been made in its repair and renewal. In the autumn of 1891 the sum of \$200 was expended in close sheathing 60 ft. in length of the west side, in placing 150 ft. of new longitudinal face timbers and a quantity of ballast. In the winter of 1892-93 about 100 feet in length of the middle portion of the work was totally destroyed by a violent gale. In October 1893 the sum of \$50.00 was spent in protecting with close sheathing the broken and exposed end of the shoreward remains of the work. A few years ago the outer block, which was left standing after the destruction of the middle 100 ft. of the work, was totally destroyed, since which time the work has been quite useless. In the fiscal year 1899-1900 the sum of \$1,000 was expended in rebuilding the shoreward end of the work. The new work, which has been very solidly constructed, has a length of about 85 feet and a width at the shore end of about 50 feet, and at the outer end, which is 12 feet high, it has a width of  $30\frac{1}{2}$  feet. It is still too short to be of very much use, but it is a great improvement on the former condition of the work.

Total expenditure to the 30th June, 1900, including refund \$1,620 to Provincial Government, \$8,667.33.



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This wharf was transferred to control of Department of Marine and Fisheries on 12th June, 1888.

## CLIFTON (OLD BARNS).

Clifton, Colchester county, is at the head of Cobequid Bay, about 7 miles distant from Truro.

During the year 1888, a loading wharf, 237 feet long, was built at this place. Total expenditure to 30th June, 1900, is \$1,496.48.

This work was transferred to control of Department of Marine and Fisheries on 20th June, 1895.

## COFFIN'S ISLAND.

Coffin's Island, Queen's county, is situated on the north-east side of the mouth of Liverpool Bay, its nearest point being about three-quarters of a mile from the mainland.

This island, which is low and flat, is about one mile long, and has a width of from one-fifth to one-third of a mile. In the eastern side near the centre of the length of the island is a small lagoon or boat harbour, protected by a shingle beach, which forms a valuable haven of refuge as well as a convenient base of operations for a numerous fleet of fishing boats. On this shingle beach is a small fishing establishment consisting of two small wharfs and several fish houses and flake yards.

This beach, in 1882-83, was protected by a rough stone and boulder break-water at the north-west point, a work which cost \$2,099.95. This work proving insufficient to afford the protection required, the department had constructed in 1883-84, at an expense of \$2,890.19, a stone-filled cribwork 12 feet wide on top and 7 feet high along the front and top of the beach for a length of 300 feet.

In 1884-85 the sum of \$994.70 was expended in extending this cribwork a length of 200 feet. These last two works have served well the purpose for which they were undertaken, having formed a nucleus around which an accumulation of stone and gravel has taken place to the very top of the cribwork.

In 1898-99 the beach protection cribwork was thoroughly repaired and extended for a further distance of 120 feet at an expense of \$939.62. The extension has a uniform width of 10 feet on top and an average height of from 6½ to 7 feet. The total expenditure incurred here for protection works up to June 30th, 1900, was \$6,924.46.

## COMEAUVILLE.

The wharf at Comeauville, Digby County, is on the southern shore of St. Mary's Bay, about 3 miles south and west from Church Point, and is one of those taken over by the Dominion from the Local Government.

Extensive repairs were made to the structure, and it was put in good order for traffic in 1882.

No important repairs were made on this work since 1888.

Total expenditure to 30th June, 1900, is \$3,139.56.

## CHURCH POINT.

Church Point, Digby County, is situated on the south-east side of St. Mary's Bay, 9 miles south-west from Weymouth, and directly opposite Petit Passage, between the extremity of Digby Neck and Long Island. It has a population of about 200 people engaged in fishing and farming, and is one of the most important

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fishing points on the Digby coast of the bay. The works here, which consist of a wharf-retaining wall and a breakwater, appear to have been built between the years 1856-66, at the joint expense of the Provincial Government and the inhabitants, the expenditure of the Government having been \$1,055.66. In 1875-76, the Department expended the sum of \$2,000, the inhabitants contributing an equal amount, in repairing the northern face and in building an L 72 feet long, 20 feet high, at right angles to it, with the object of preventing the gravel from working round the outer end. In 1889-90 the sum of \$32.69 was spent in placing some new fenders at the loading berth, and in other slight repairs. In 1890-91, the gravel having worked round the outer end of the breakwater and formed a bar across the entrance to the loading berth, the Department, at a cost of \$100.81, built a spur or groyne 40 feet long and 24 feet wide, projecting at right angles from the outer or north-west corner of the breakwater. In 1891-92, the river, or east face, of the older portion of the work, having become very much decayed, and in places falling down into the dock, the Department expended the sum of \$1,434.38 in repairing it and in removing the highest part of the gravel bar so that vessels could approach and lie alongside. The repairs extended over almost the entire length of the river face. The inner end, or oldest portion, was taken down and rebuilt in cribwork, and the remainder was close piled, small general repairs being also made to other parts of the work. In 1892-93 the Department spent the sum of \$45.25 in removing the bar of gravel that had worked round the end of the groyne and the breakwater, and obstructed the approach of the loading berth. In 1894-95, the gravel continuing to work round the end of the groyne, an extension was built to it 30 feet long, 15 feet wide and 13 feet high, at a cost of \$350. In 1896-97 the sum of \$3,971.51 was expended in extending the groyne 120 feet long, 16 to 25 wide, and from 12 to 22 feet high. The dam and sluice gates at the head of the dock, where the fresh water stream makes exit, were rebuilt in order to command a stream for scouring away the gravel from alongside the wharf front. The sluice gate is 10 feet wide and 7 feet high, and is raised by means of a windlass. In 1899-1900 the sum of \$130.77 was expended in close piling and planking about 60 feet in length of the face of the cribwork on the upper or landward side of the sluice-way in order to prevent the water impounded by the sluice gates from undermining the work.

Total expenditure to 30th June, 1900, including refund of \$1,692.00 to Provincial Government, \$10,310.36.

This work was transferred to control of Department of Marine and Fisheries on 12th June, 1888.

#### COW BAY (PORT MARIEN)

Cow Bay, Cape Breton Co., is on the eastern coast of Cape Breton Island, about 18 miles eastward of Sydney harbour. Extensive coal mines in the vicinity make it a place of considerable importance.

The Bay is two and a half miles wide at the mouth and, being open to the Atlantic from the east, affords no safe anchorage during gales from that quarter.

Prior to 1867, with some aid from the Government of Nova Scotia, a breakwater was built on the north side of the Bay by Messrs. Archibald & Co., proprietors of the Gowrie Mines.

The breakwater was 1,386 feet in length and was originally about 44 feet in width and had a depth, at the outer end, at low water, of 17 feet. The area of the basin enclosed between it and the loading pier of the Gowrie mines was 17 acres, 10 acres of which had originally a depth of from 9 to 17 feet at low water. Spring tides rise 5 feet.

In 1873, while repairs undertaken by the department were in progress, the breakwater was seriously damaged by the great gale of the 24th of August. After

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the gale, operations were resumed, the balance of the amount appropriated being largely supplemented by Messrs. Archibald & Co.

In 1874, Messrs. Archibald & Co.'s interest in the breakwater was acquired by the Dominion Government, and a contract entered into in May, 1876, for repairing and strengthening the structure, was completed in July, 1877.

Extensive repairs and improvements were made nearly every year up to 1895 when the breakwater consisted of an inner work extending from within 220 feet of the shore end to the outer end, and of counterforts with connecting outer face works, from within 580 feet of the shore end to within 56 of the outer end. The outer and inner works were about 22 feet apart and were connected by tie walls. The spaces between them were filled with earth and stone ballast.

During heavy easterly gales, on the 3rd and 8th February, 1895, a breach was made through the breakwater near the outer end, 140 feet of the outer face work (including 70 feet recently reconstructed) was destroyed, and the work opposite to it was carried away, down to below low water; about 25 feet of the outer work between the two outer counterforts was also destroyed; ballast was washed out in several places and some close piling was carried away.

In 1895-96 the sum of \$3,999.87 was expended in urgent repairs to the outer face works from 1128 feet from the shore end, inwards.

In October 1896, the outer portion, which withstood the gale of Feb. 1895, was carried away, and the outer face works from 1128 feet from the shore end inwards, were badly damaged.

During the years 1897-98 and 1898-99, the sum of \$14,988.40 was expended in repairing, reconstructing and strengthening the outer face work.

During the fiscal year 1899-1900, the sum of \$3,409.10 was expended in renewing the stringers and covering of 534 feet of the inner work (581 to 1115 feet from the shore end) and in repairing and strengthening the outer works. The repairs to the outer works included filling with concrete to half tide level and reballasting 143 feet of the narrow outer face work (277 to 420 feet from the shore end), and in placing concrete in the face-chambers, reballasting, and covering the inner 20 feet of the central counterfort, the outer 40 feet of which was destroyed after repairs were effected in 1898-99.

Total expenditure to 30th June, 1900, including \$25,000.00 for purchase of breakwater, is \$214,655.47.

This work was transferred to control of Department of Marine and Fisheries on 12th June, 1888. ]

## CRIBBIN'S POINT.

Cribbin's Point, Antigonish Co., is on the west side of St. George's Bay, 8 miles to the southward of Cape George and 5 miles to the northward of the entrance to Antigonish harbour.

The wharf at this place, completed in 1891-92, extends 300 feet in a southerly direction from the point, and has an approach 195 feet in length. The wharf is 20 feet in width, on top, for a distance of 120 feet from the inner end, and 30 feet, for the remaining 180 feet; the inner 50 feet being of stone and the outer 250 feet, of close-faced timber work, fully ballasted. The depth at extreme low water, at the outer end of the wharf, originally 11 feet, is now about 8 feet. Spring tides rise 4 feet.

The face-timbers having been weakened by the ravages of the teredo, the sum of \$2,999.39 was expended during the fiscal years 1896-97-98, in strengthening and protecting the work. A talus of quarried stone was placed on the seaward side over a distance of 180 feet from the outer end, some empty face-chambers were re-ballasted and 80 pieces of creosoted timber were procured for close-piling the outer end, and 63 of these were placed and secured.

During the year 1898-99, the sum of \$390.00 was expended in completing

the close-piling, in placing additional stone on the slope, in re-ballasting empty face-chambers, and in removing a quantity of gravel which had been carried by the sea, over the covering at the inner end of the work.

During the last fiscal year the sum of \$299.95 was expended in removing about 175 cubic yds. of sand from the top of the covering, near the inner end of the wharf, in constructing a timber "break," 100 feet in length and 2½ feet in height, at the inner end of the wharf, to prevent the sand from washing on to the work, and in placing about 120 cubic yds. of quarried stone in the talus on the seaward side.

A further sum of \$1,000.00 was appropriated for expenditure in the construction of an extension, and the amount was expended in obtaining a portion of the creosoted timber required for the sub-structure of the proposed work.

Total expenditure to 30th June, 1900, is \$13,546.17.

This wharf was transferred to control of Department of Marine and Fisheries on 2nd October, 1895.

#### DE LAP'S COVE.

Delap's Cove, Annapolis county, is situated on the south shore of the Bay of Fundy, and is about 12 miles to the eastward of Digby Gut.

The breakwater is constructed immediately to the eastward of the mouth of a small pond which affords safe shelter for fishing boats and a convenient place for keeping small vessels during the stormy winter months. The breakwater itself affords a good loading place for coasters and small schooners, the pier breaking off all easterly storms, the formation of the coast on the opposite side of the stream forming a natural western breakwater.

This breakwater was built by the Department in 1878-79, at a cost of \$2,150. It is 156 feet long and 25 feet 3 inches wide, and is constructed of round timber, with square timber faces, its easterly side being sheathed with 8 inch timber. It is provided with a "break" 4 feet 6 inches high along its seaward (easterly) side, and its covering is of 6-inch material.

In 1885, the sum of \$50.00 was expended in repairing the foundation of the seaward face and depositing large stone along it, to prevent the gravel from washing away. The whole pier is in good order and is in need of no immediate repairs.

During the past year the sum of \$1,000 was expended in protecting the entrance to the pond and in placing an anchor and buoy off the outer end of the pier to enable vessels to warp out and proceed to sea, and avoid the danger of going ashore on the western headland to which they were formerly exposed.

The opening into the pond was protected by extending the western face of the pier inwards 100 feet, along the face of the stream, or to where this latter opens out into the pond, and in raising the beach on the seaward side of the pier and preventing the stone and gravel from being thrown over the sea wall. The wharfing along the stream is of an average height of about 16 feet and 12 feet wide, and the entrance to the pond is now clear and unobstructed.

The warping anchor is a large rock, placed in position and fitted with proper chains and tackles, and during the summer months has a spar buoy attached. This latter is removed in winter, to avoid danger of drifting ice.

Total expenditure to 30th June, 1900, is \$3,224.46.

This work was transferred to control of Department of Marine and Fisheries on 28th November, 1889.

#### D'ESCOUSSE.

D'Escousse Richmond county, is a thickly settled district of Isle Madame, on the southern side of Lennox Passage, a strait separating the island from the mainland, and connecting St. Peter's Bay with the Strait of Canso.

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A contract entered into in 1893-94 for the construction of a wharf at Poule-ment ; about half a mile to the westward of the village of D'Escousse, was completed the following year. The work consists of an approach 315 feet in length, a stone embankment 107 feet in length, and a creoseted pile extension 120 feet in length. The depth at extreme low water at the outer end of the work, obtained by dredging in 1894-95, is 10 feet. Spring tides rise 6 feet, neaps 4 feet.

During the year 1895-96 the sum of \$236.54 was expended in constructing a slip on the west side of the pile extension, and in widening the approach at its intersection with the highway and with the stone embankment.

Total expenditure to 30th June, 1900, including dredging, is \$14,475.75.

## DIGBY.

Digby, the capital of the County of Digby, with a population of about 1,500, is beautifully situated at the south-western end of the Annapolis Basin. It is an important station on the Dominion Atlantic Railway, 70 miles north from Yarmouth, 150 miles from Halifax, 20 miles from Annapolis, and it is also a port of call for the daily steamer of the Dominion Atlantic Railway plying between Digby and St. John. The harbour is open at all seasons, and well protected from nearly all quarters : storms, however, from the north and north-east, drive a heavy sea against the pier and if at such times, there be much drift ice in the basin, the structure is liable to suffer damage.

The first pier was built by the Government of Nova Scotia some years before Confederation, and was nearly destroyed by the gales which swept the Bay of Fundy in 1866-67. In 1869, to aid in rebuilding the work, the sum of \$2,920 was granted by parliament and transferred to be expended by the Provincial Government. The pier, as then built, was of pile-bents 12 feet apart, for 560 feet, next was a block of cribwork 80 feet long, 45 feet wide, the southern half of which was sloped to form an inclined slope rendered necessary by the great rise and fall of the tide (27 feet at springs). This incline was finished by a block 170 feet long by 22 feet wide, the northern half of this portion of the pier being all pile-bents 8 feet apart. The outer end of the pier consisted of a block 56 feet long, 45 feet wide and about 40 feet high. The whole of the northern face was close piled, the total length of the structure being 870 feet. In 1872 the sum of \$1,650 was expended by the department in completing and repairing the pier.

In 1874 a number of piles and braces were renewed, the outer block newly fendered, and new joists and planking laid for the total length, at a cost of \$2,500. During the gale of February 22, 1879, a schooner loaded with produce for the West Indies, parted her cable and was swept bodily through the pier, carrying away a length of 130 feet, which was rebuilt at a cost of \$2,367.73. In 1881-82 the sum of \$888.57 was expended in renewing a few piles and other timbers that had been eaten away by the limnoria, making a total expenditure up to June, 1882, of \$10,326.30.

In December, 1885, the outer end of the pier was destroyed by a severe gale and in 1885-6 the sum of \$1,945.62 was expended in repairs. In 1886-7 a further amount of \$767.62 was also spent on the same repairs. In 1887-8 the sum of \$7,467.68 was expended in the construction of a block 40 x 40 feet on the site of the displaced outer block, of an inclined landing 26 feet wide and 80 feet long between the new outer block and the undestroyed inner portion of the pier together with a road-way on pile and frame bents connecting the whole work with the new outer block. In January, 1888, operations were begun towards rebuilding the pier to its original length, and the departmental report for the year 1888-9 shows an expenditure of \$4,498.14. Up to June, 30th 1889, the new work consisted of a block 45 x 45 feet to replace the former one. It is built of round timber with double sets of face logs, and is fully ballasted ; it is 45 feet high, and connected with the older portions of the pier by a cribwork inclined landing,

over the top of which a deck wharf is carried on heavy frame bents. The inclined landing and its superstructure is 25 feet wide. The inshore or pile work section was strengthened and repaired in places, and parts of the worn and decayed plank covering were renewed. In 1889-90 the sum of \$392.91 was expended in driving heavy piles along both the northern and southern sides of a centre block which was shifted and damaged by a storm of December, 1885, to prevent any further movement. In 1890-1 and again in 1891-2 small expenditures were made in general repairs.

In 1890 a contract was entered into for the construction of a landing pier to be built on a new site, viz., on the north side of the "Racquet," about a mile to the northward of the present pier and the town of Digby. For this purpose a quantity of timber and iron had been procured by the contractor, Owing, however, to numerous delays, and the death of the contractor, the intention of building this new pier was abandoned, and it was decided instead to reconstruct and repair the present pier, utilizing as much as possible the timber and iron belonging to the estate of the deceased contractor. The work of reconstruction were carried out by day labour at a cost of \$15,248.15; they consist of the following:

1st. The renewal of the whole of the pile work section from the shore to the head of the inclined landing, a distance of 560 feet; the inner 430 feet being 30 feet wide on top, and the outer 110 feet, 45 feet wide. The bents are paced 10 feet apart; the inner portion having six and the outer eighth bearing piles in each bent. Fenders or guard piles are placed on both sides of the work at each bent, and sheet piling 6 inches thick driven over the whole length of the northern face, two sets of walings each 12 inches square being placed on the inner and outer faces of the same.

2nd. The removal of the cribwork block forming the head of the inclined landing down to the foundations and the construction of a new block 80 feet long and of an average width of 37 feet.

3rd. The sheet piling of the seaward face of the inclined landing from the end of the new block outwards for its entire length, and placing of new covering and floor stringers on the incline for a length of 78 feet.

4th. The removal of the old warehouse and office and erection of a new building 72 feet long and 20 feet wide, with a covered driveway along the whole south side, 15 feet wide.

In April, 1894, a length of 330 feet of the close-piling along the north side of the pier was destroyed by a violent gale, together with the caps and walings for the same distance, and about ninety of the main outside bearing or fender piles. In order to save the rest of the structure from the scouring action of the undertow set up by the sheet piling, the rest of it was immediately cut out, the sum of \$141.69 being spent in effecting this work, and in saving the sheet piling and other timber that had been knocked adrift, and piling it up on the inner wharf. Subsequently, in May and June, 1894, the sum of \$1,410.03 was expended in making good the damage done by the April storm. The sheet-piling having proved a mistake, it was not replaced, but about ninety new heavy piles were driven and thoroughly braced and bolted.

In 1895-96 the sum of \$4,341.99 was applied in filling with substantial, close-piled trestle work a space or recess on the north side of the pier near its outer end, 210 feet long by an average width of 17 feet, and in raising from two to three feet and renewing the entire floor of the outer 225 feet in length of the work.

In 1896-7 the sum of \$3,132.89 was applied to the reconstruction of the southern half of the shore end of the pier for a length of 450 feet in substantial pile work; the new work was covered with 6 inch plank and securely capped, fendered and braced.

In the year 1898-9 the sum of \$579.80 was expended in the renewal and repair of the outer south corner of the pier which was damaged by being struck by the Dominion Atlantic Railway steamship *Prince Rupert* during the south-east

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blow in April, 1899. In addition to this 40 feet in length of the inclined slope was replanked with 6-inch plank, and a couple of new fender piles were bolted in position.

The importance of this work may be judged from the fact that the collections for wharfrage during the year 1898 (January to December, inclusive), amounted to \$2,221.05.

The total expenditure incurred by the department in connection with Digby Pier, up to June 30, 1900, amounts to \$93,569.80, which may be subdivided as, follows :

Construction, including refund of \$11,632 made to Provincial Government in 1887-8.....	\$59,864 45
Repairs.....	29,513 33
Dredging.....	4,192 02
Total.....	\$93,569 80

This work was transferred to control of Department of Marine & Fisheries on 12th June, 1888.

## EAGLE HEAD.

Eagle Head is situated on the Atlantic coast of Queen's County, about eight miles to the eastward of Liverpool.

Previous to 1883 a stone breakwater, 275 feet in length, was built at this place by the Local Government, and the amount appropriated has been expended in the construction of a further length of 125 feet, and repairing the old work.

No important repairs were made since 1883.

Total expenditure to 30th June, 1900, including refund of \$1,344.67 paid to Provincial Government, is \$3,843.92.

## EAST BAY.

East Bay, Cape Breton County, is at the head of East Bay, an arm of the Great Bras d'Or Lake.

The original wharf at this place was built by the residents, aided by the Provincial Government ; it was a block and span structure 15 feet wide, with a T head (block and span) 70 feet in length and 18 feet wide. In 1882-83 a block 71 feet 6 inches by 22 feet was added to the outer end by the Federal Government. In 1888-9 and 1891-2 the blocks of the approach were reconstructed, and during the latter year the blocks of the original T head were renewed and the face and ends of the block built in 1882-3 were close piled.

The depth along the outer face of the head, at ordinary lake level, is 11 ft.

The expenditure up to the end of the fiscal year 1897-8 amounted to \$3,452.80, of which \$399.58 was for repairs and the balance for construction.

During the fiscal year 1898-9, the sum of \$254.24 was expended in repairs and renewals. The covering, guard-rails, floor stringers and upper longitudinal timbers of the head (71 feet 6 inches x 22 feet), and the covering and floor stringers of 35 feet of the approach were renewed ; and the hand rail on each side of the approach was removed and replaced by a guard rail of 9 x 9 inches squared timber.

Total expenditure to 30th June 1900, is \$3,707.04.

This work was transferred to control of Department of Marine and Fisheries on 28th February, 1884.

## EAST BAY (NORTH SIDE).

In 1889-90 a wharf was constructed, in Cape Breton County, on the north side of East Bay, an arm of the Great Bras d'Or Lake,  $5\frac{1}{2}$  miles to the westward of the head of the bay. The distance to Sydney is  $17\frac{1}{2}$  miles, and to the nearest station on the Intercolonial Railway  $10\frac{1}{2}$  miles.

The wharf consists of an approach of brush and stone 50 feet in length and 20 feet in width, and a block and span cribwork extension 172 feet 7 inches in length, with an L at the outer end 20 x 30 feet. The depth at the outer end is 10 feet at low, or 11 feet 3 inches at high lake level.

The expenditure up to the end of the fiscal year 1898-99, including \$50.00 expended during the year in repairs to the covering, amounted to \$2,049.87.

During the fiscal year 1899-1900, the sum of \$300.00 was expended in repairing the wharf. The repairs included: repairing and grading the approach; replacing nearly one half of the covering with new 3-inch plank; renewing unsound floor-stringers, guard rails and chocks, and in placing 6 new hardwood fenders and 4 new mooring posts.

Total expenditure to 30th June, 1900, is \$2,348.87.

## EAST JORDAN RIVER.

Jordan River is one of the largest and most important streams in Shelburne county, flowing for a great part of its length through valuable timber country.

It empties into the Atlantic about 3 miles east of Shelburne, the county town, and its mouth forms an estuary about 4 miles long, and from a mile to a mile and a half wide, with deep water for its whole area. At the head of the bay or estuary, which is called Jordan Bay, and on its east side 9 miles west of Lockport, and 8 miles east of Shelburne, is a thrifty settlement of some two or three hundred people engaged in farming, lumbering, fishing and general trade. Two and a half miles farther up the river is another prosperous village called Jordan River, with a population of about 700. Here, as well as farther up the stream, are important lumber mills, where large quantities of sawn lumber are prepared for export.

The bay having straight shores and being exposed to the south and south-east, affords no shelter from gales from these quarters, and considerable risk and inconvenience was formerly experienced by the numerous large vessels that came to load lumber. In order to benefit this trade, therefore, and for the improvement of general shipping facilities, the department in 1875 constructed a breakwater on the east side of the mouth of the river, or the head of the bay, at the village of East Jordan.

This work which was substantially built of close-faced squared timber cribwork filled with stone, at a cost of \$24,568.79, is 550 feet long and 30 feet wide, and at the outer end 23 feet high, when at high water ordinary spring tide, there is a depth of 19 to 20 feet of water (spring tides rise 7 feet, neaps  $5\frac{1}{2}$  feet).

In 1878 a quantity of heavy stone was deposited on the seaward face and end to protect the foundation from the scouring action of the waves and tidal currents.

In the spring of 1879 the upper portion of the outer end for a length of 100 feet was destroyed by a heavy gale to within 2 feet of low water mark. This damage was made good in 1882-3 by an expenditure of \$5,046.12, when, owing to the settlement of the seaward or southern side of the work, the greater part of the top was rebuilt and straightened up, the seaward face, moreover, being thoroughly protected by a slope of stone reaching to high water mark. Width of breakwater at top as completed, 18 feet.

In 1883-84 slight repairs were made at a cost of \$102.50.

In 1890-91, a portion of the plank covering and sheathing having been torn off during a heavy storm, it was replaced at a cost of \$30.03.



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In 1891-92 the inner end of the work which was damaged by a high tide and heavy sea, was repaired. The plank covering and floor stringers for a distance of 100 feet, as well as some of the face timbers, were carried away, and a considerable quantity of ballast was washed out. All this was replaced by new work, and a large amount of stone was placed along the inner end of the slope, where this had in places been washed out. The cost of these repairs was \$750.

During the fiscal year 1898-99, the following works of repair were carried out at a total cost of \$2,348.32, viz. : from the head or outer end shorewards ; increasing the width of the breakwater 12 feet, by means of pile trestle bents placed every 5 feet, and putting on new stringers, new flooring and guard rails.

Whilst the repair work was being performed it was ascertained that the work was in a much more dilapidated state than was at first discernable, and that further repairs were required. The breakwater was, however, left in thoroughly safe condition. The excessive piling of large quantities of timber upon the breakwater in former years subjected the work to unnecessarily heavy and injurious strains. Strict orders have been issued to the present wharfinger to prevent the recurrence of such practices in the future.

The total expenditure incurred for construction up to June 30, 1900, is \$29,792.24, and for repairs, \$3,230.85.

This work was transferred to control of Department of Marine and Fisheries on 11th July, 1896.

## ECONOMY.

Economy, Colchester County, is situated on the north side of the Basin of Minas, 17 miles west of Great Village and 21 east of Parrsboro.

A wharf was built by the department in 1887-88, 208 feet long and 25 feet wide, at a cost of \$2,500.

In the summer of 1890, an extension was built 100 feet long and 25 feet wide with an L, 25 feet long on the outer end, at a cost of \$2,500. In the summer of 1891, a second extension was built 100 feet long of the same width as the rest of the structure, at a cost of \$2,200. In the autumn of 1891, a third extension was built 55 feet in length, at a cost of \$1,000.

The whole structure was substantially built of round log cribwork, well ballasted and double fendered.

Its average height is about 18 feet and at the outer end, at high water ordinary spring tides, there is about 16 feet of water.

Spring tides, rise 46 feet, neaps 39 feet.

During the year 1896, the sum of \$159.45 was spent in laying new plank flooring for 190 feet in length of the shoreward portion, and in putting some new fenders on the outer block.

Total expenditure to 30th June, 1900, is \$8,840.89.

## ENGLISHTOWN.

Englishtown, Victoria Co., is situated on the southern shore of, and immediately within the entrance to St. Ann's Harbour, a fine basin, 7 miles in length, about 2 miles in width, and carrying a depth of about 50 feet, at the head of St. Ann's Bay on the north east coast of the Island of Cape Breton.

A contract was entered into on the 23rd August for the construction of a wharf at this place. The work under contract being 236 feet in length, and consisting of an approach 27½ feet in length and 20 feet in width on top, and of 5 cribwork blocks each 20 x 20 feet on top and an outer block 20 x 40 feet on top, with openings of 17½ feet. The sub-structure of each block to be of creosoted timber. The depth at extreme low water, at the outer end will be 12 feet. Spring tides rise 5 feet.

Owing to the delay in obtaining the necessary creosoted timber, the work of construction could not be commenced until May 29th, but very good progress was made since, and up to the end of the fiscal year the sub-structure of all blocks, excepting the outer one, were in place and fully ballasted.

P.S.—The work was completed on August 11th, 1900.

Total expenditure to 30th June, 1900, is \$3,761.31.

#### FIVE ISLAND.

Five Island, Colchester County, is a village situated on the northern side of the Basin of Minas, at the extreme western end of the county, and 15 miles to the eastward from Parrsboro.

During 1885, a wharf 75 feet long and 40 feet wide was built by the Department at "Narrow Beach" (so called). In July, 1893, the sum of \$370.38 was expended in placing an entirely new floor, with stringers and guard timbers; the raising of the outer end of the wharf, about two feet which had settled to that extent; and the construction of an inclined ramp, or shoot, in the end of the wharf for the purpose of loading deals on the decks of schooners lying dry after the tide had fallen.

No important repairs have been made since 1894.

Total expenditure to 30th June, 1900, \$2 870.32.

#### FOX ISLAND OR (LAURENCETON).

Fox Island or Laurenceton, Halifax County, is situated on the Atlantic coast of Nova Scotia, about 15 miles east of the city of Halifax and about 800 feet from the mainland. It is a very small island being only some 3 or 4 acres in extent, and no point on it is more than 6 feet above high water of ordinary spring tide. Without permanent inhabitants it is during the summer months used as a fishing station, being then occupied by fishermen and their families. Until 1879 it was connected with the mainland by a shingle and gravel bar, which being bare at all times of tide, was used as a road for carts hauling supplies of stores and fresh water to the fish houses on the island. Besides serving as a road, the beach with the island, formed a harbour for fishing boats.

During the early part of 1880 the sea broke through the beach, and the in-roads continued until 1885 till the beach ceased to afford adequate shelter or to serve as a means of communication between the mainland and the island. To restore its usefulness the department in 1886-7 built beach protection work extending the whole length of the beach, a distance of 935 feet. This work, which was built by contract at a cost of \$3,333.69, consisted of round timber cribwork battering one in four on the sides, 13 feet wide on top, from 3 to 6 feet high, and with a stone slope of 2 to 1 on each side, extending up to 2 feet below the top of the work. The whole cribwork was filled with stone to the level of the top timbers.

In 1891, a sum of \$50 was applied in making repairs, and in 1892-3 the work was extended a distance of 252 feet in order to protect the main body of the island, at a cost, by day's work, of \$650.98. In 1893-94 the sum of \$412.96 was expended in rebuilding 120 feet in length of the old protection work at its junction with the new, and re-enforcing the toe of the rip-rap with some more stone. During the year 1898-9 the sum of \$200 was expended in purchasing materials for the purpose of making some much needed repairs to the work.

Total expenditure incurred 1887 to 1889, \$4,647.63, of which amount \$250 was laid out for repairs and the balance, \$4,397.63, for works of construction and improvement.

Total expenditure to 30th June, 1900, is \$4,947.63.

FRENCH RIVER.

French River, Victoria County, is on that part of the east or Atlantic coast of Cape Breton Island, known as the "north shore," midway between the harbour of St. Ann's and South Ingonish.

A contract entered into in 1890-91 for the construction of an isolated breakwater 50 feet in length, 27 feet in width on top, in from six to seven feet at extreme low water, was completed the following year; it is of square timber, and is close fendered at the sides and at the outer end.

Shortly after the completion of the work, the ballast went out of the face chambers on the the east side, and subsequently the work settled to within one foot of extreme high water, at the north-east angle, and the ballast went out of about half the face chambers on the west side.

During 1892-93 the work was rebalasted and large stones were placed over brush on the eastern side, to prevent scouring.

Up to the 30th of June, 1894, the sum of \$250.03 was expended in placing ballast in one pocket on the western side, and several in the eastern side of the work; and in replacing and bolting the cap timbers on the eastern side, and in placing boulders over brush at each end and over the stone placed in 1892-93.

Total expenditure to 30th June, 1900 is \$3,504.93

GABARUS.

Gabarus Bay, on the Atlantic coast of Cape Breton Island, is 5 miles wide at the entrance between White Point and Gabarus, and extends inland 5 miles.

Under date of 14th April 1894, a report was submitted on a proposed breakwater at Harbour Point on the south side and near the head of the Bay, to protect the anchorage in Gabarus Cove which affords, during the summer months, a tolerably safe anchorage for vessels of moderate draught, but which is rendered unsafe in the autumn, during northerly and easterly gales. The estimated cost of the work proposed to protect the anchorage in Gabarus Cove was \$50,000.

At the last session of Parliament the sum \$3000, was granted towards the construction of a breakwater at this place. On Nov. 7, 1899 instructions were received to prepare plan and specification for as much work as could be constructed for the amount appropriated.

A survey of the site was made during the winter and on March 7th, 1900, plan and specification for a length of 190 ft. of work, were forwarded to the department for approval. The work specified was as follows: Inner section (70 feet in length) to be of round native timber crib-work, laid open faced and 16 feet wide on top, the outer section (120 feet long) to be constructed with squared timber faces, laid close and 24 feet wide on top, with a creosoted timber sub-structure; and the seaward face of the whole work, the outer and the inner face, for a distance of 15 feet from the end, were to be close-sheathed.

Contract for this work was let on Sept. 5th, 1900 to Hugh McDonald of Sydney, for the sum of \$7,882.

GEORGEVILLE.

Georgeville, Antigonish Co., is on the southern shore of Northumberland Strait, 6½ miles south-west from Cape George.

The wharf at this place, as completed in 1891-92, was 207 feet long, 20 feet wide on top, with an L 20 x 20 feet, making a width at the outer end of 40 feet, and extended out into 5½ feet at low water. The approach, 87 feet in length, is of stone and the remainder of the work, of squared timber, close-faced, fully ballasted and protected by sheathing and fenders.

The sum of \$1,800,—was made available for expenditure during 1896-97 to construct an extension, 44 feet in length, 40 feet wide, with an L. 20 x 24 feet. Active operations were commenced early in June and were in progress at the close of the fiscal year, when the substructure of the extension was constructed and made ready for launching. The expenditure amounted to \$773.84.

During the year 1897-98, the extension was completed and some slight repairs to the old work were effected, the total expenditure amounting to \$1,782.

During the last fiscal year the sum of \$109.96 was expended in repairing some damage to the top of the outer end of the wharf, caused by the weight of ice thrown upon it during a gale. The repairs consisted in renewing some floor-stringers, covering and cap and in replacing some ballast.

The depth at extreme low water at the outer end of the extension is 6½ feet. Spring tides rise 4½ feet.

Total expenditure to 30th June 1900 is \$10,538.53.

#### GRAND ETANG BRIDGE

Grand Etang, Inverness Co., is situated on the Gulf of St. Lawrence about midway between the harbours of Margaree and Cheticamp.

The opening of a channel through a beach which separated the waters of the Gulf from a large and deep fresh water pond, and the construction of channel protection works to make the pond available for the use and shelter of fishing boats and small vessels, necessitated the diversion of the high-way across the beach and the construction, in 1895-96 of a bridge across the pond, 500 feet above the former crossing.

The bridge is 563 feet in length, including the east and west approaches of brush and stone with crib-work abutments, respectively 74 and 51 feet in length; and 438 feet of pile work. It is provided with a hand rail on each side, an opening for boats, and a temporary draw.

In 1898-99, 25 piles were driven in place of piles destroyed or badly damaged by the teredo.

During the year, the sum of \$154.34 was expended in placing 38 piles, 36 to 40 feet in length, at the sides of bents in place of unsound piling, and in removing and replacing covering and hand rail.

The renewal of piling with native timber can only be considered as temporary repairs. To insure the safety of the bridge all the piles should be replaced with creosoted piling.

Total expenditure to 30th June 1900 is \$27,866.79.

#### GRAND NARROWS.

Grand Narrows, Cape Breton County, is on the south side of the Grand Narrows, a strait connecting the Great and Little Bras d'Or Lakes.

The wharf at this place is 287 feet in length, including 67 feet of crib-work filled with brush and stone, and covered with gravel; 80 feet of pile work built in 1885-86 by the department over the remains of the outer portion of an old landing pier built by the Provincial Government; and an extension, 140 feet in length, built by the department in 1883-84.

The extension consists of three blocks each 20 x 20 feet, and an outer block 20 x 60 feet of round timber cribwork, with openings of about 16 feet.

The depth at the outer end of the extension is 12 feet at low, or 13 feet at high lake level.

During the year 1891-92 the sum of \$749.75 was expended in renewing the piles in one bent of the pile work, and replacing the stringers; in raising, repairing and close-piling the channel and end faces of the outer block of the exten-

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sion; in placing 25 fender piles where required, and in renewing the covering over 105 feet of pile work and extension.

Total expenditure to 30th June, 1900, including refund of \$1,280.70 paid to Provincial Government, \$5,539.27.

This work was transferred to control of Department of Marine and Fisheries on 12th June, 1888.

## GREAT VILLAGE.

Great Village is a thriving and enterprising village of about 1,000 people situated on the north side of Cobequid Bay, and on the Great Village River 11 1/2 miles above its mouth. It is 15 miles west of Truro, the country town, at the extreme head of the Bay, and 3 1/2 miles from Londonderry station on the I.C.R. About five miles to the north is the village of Acadia Mines, with a population of 2,000, where are situated the works of the Londonderry Iron Co. The chief industries of the place are shipbuilding and farming, and, the surrounding country being prosperous and thickly settled, a considerable general trade is done. About the year 1865 a wharf was built on the left or east bank of the river just below the village, by the Acadia Iron & Charcoal Company for their own use before the completion of the I.C.R. This wharf with the land round it and the other property of the Acadia Iron & Charcoal Company was afterwards bought by the Steel Company of Canada, being subsequently transferred to the Londonderry Iron Company, the late owners of the mines. The wharf of which the public always had the free use, was very roughly built of round log cribwork. It had a finished length of 45 feet and a depth of 15 feet of water at the face at H. W. O. S. T. In the year 1891 the Department built a new wharf on the side of the old one, 70 feet square on top, at a cost by contract of \$1,940. The work is substantially built of round log cribwork, the three outer sides, which batter 1 to 12, being closed sheathed and double fendered. Its outer face is 19 feet high, affording about 17 feet of water at H. W. O. S. T. The wharf is used during the shipping season by a large number of vessels landing general merchandise, and loading agricultural produce and a small quantity of lumber. In 1892-93 \$240 was expended in general repairs; in 1893-94 \$27.86 and '94-95 \$450. During the fiscal year 1899-1900 the sum of \$239.58 was expended in renewing the whole of the floor with stringers and guard timbers, and in raising and filling the approach with stone and gravel.

Total expenditure to 30th June, 1900, \$2,834.01 and on protection works \$11,250.00 more.

## GROS NEZ

Gros Nez is a small fishing station at the eastern extremity of Petit de Grat Island, Richmond County, C.B.

During the year 1885-86, a breakwater, 150 feet in length, was built to shelter the anchorage and landing place for fishing boats.

Total expenditure to 30th June 1900, including refund of \$106.95 paid to Provincial Government, \$1,856.85.

## GROSSES COQUES

Grosses Coques, Digby County, is situated at the mouth of a small river emptying into the St. Mary's Bay, about seven miles to the westward of Weymouth.

The pier at this place was built many years ago by private subscription aided by grants from the Local Government. For the last ten or twelve years, little or no repairs having been made the river face of the structure became much dilapidated, and parts of it fell into the stream rendering the pier quite useless for shipping purposes.

An appropriation of \$3,000 was made during the session of 1888-89 for repairing the face of this pier, the inhabitants agreeing to assist by subscribing certain materials and labour gratis, and during the year 1890 the entire river face of the pier as well as the eastern breakwater have been rebuilt.

The eastern breakwater was rebuilt wholly by the inhabitants and is a light piece of work, constructed many years ago to confine the river mouth and prevent any undertow at the loading berths.

The new river face of the main pier is built of large size round timber, is 628 feet in length, and at the outer end 20 feet high, decreasing in height to 15 feet at the inner end.

The new face is of various thicknesses owing to the old work being found sounder in some places than in others, but it is all constructed in the same manner with cross-ties and fenders at 8 foot centres and two ballast floors throughout. On top it averages 22 feet in width and has three sets of longitudinal timbers, on the bottom it is somewhat less, the cross-ties being run in and secured to the old work wherever this latter was found sound enough.

The whole amount of the appropriation has been expended and all the timber work is done and the work completed in every way, except ballasting on the upper floor for about half the length of the structure.

Total expenditure to 30th June 1900 is \$2,999.99.

#### HALL'S HARBOUR

Hall's Harbour, King's county, is situated on the south side of the Bay of Fundy, about 65 miles north-east from Digby Gut and 12 miles south-west of Scott's Bay; it is about 12 miles north-west from Kentville and county town of King's and the headquarters of the Dominion Atlantic Railway. The village has a population of some twenty families, and some years ago had a considerable shipping trade, which, however, of late years has dwindled to insignificant proportions. About the year 1839 the inhabitants, aided by the provincial government, built timber retaining walls on both sides of the harbour, which consists of a land locked basin, dry at low water of about an acre in extent, to permit vessels to lie alongside the public road. About 1844 an addition seawards to the wall on the west side was built in order to check the accumulation of gravel at the mouth of the harbour, and to serve as a breakwater. About 1885 an addition of 100 feet in length was built to this breakwater at a cost of \$2,000. In 1884 it was repaired by the department at a cost of \$750 and on November 6, 1884, the outer block was destroyed by a violent gale, the accompanying heavy seas having also the effect of depositing a bank of gravel which almost entirely obstructed the mouth of the harbour.

Between 1884 and 1891 the only expenditure made upon the work was a sum of \$49.97 applied in sheathing the exposed and broken ends. In 1891 the sum of \$500 was spent in re-building the face of the timber retaining wall on the eastern side of the harbour, 270 feet long. In November, 1893, the sum of \$100.08 was spent in a few much needed repairs to the breakwater on the west side. In 1895-6 the sum of \$450.83 was expended in repairs to the breakwater on the east side, and the south or shoreward end was raised from 2 to 5 feet, the whole top, 102 feet in length, was relaid with new 6 inch flatted spars with new floor stringers. Twenty-six new fenders were placed, a new piece of break was built on the north side of the shoreward end 30 feet long, 5 feet high and 5 feet wide. The shore end was also filled with ballast and levelled up with gravel.

Hall's Harbour, though small, is one of the best between Scott's Bay and Digby Gut. Spring tides rise 39 feet, neaps 33 feet. During the year 1898-9 the sum of \$199.68 was expended in repairing the old breakwater, the work done consisting of the close sheathing of several weak spots on both the outer and inner sides, the renewal of a considerable portion of the floor, and the placing of

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a number of new fenders and mooring posts. On January 4, 1899, a contract was entered into with J.B. MacManus for the extension of the breakwater a length of 120 feet, for the sum of \$3,200. The contract stipulated that the work should be finished at the end of the fiscal year, June 30, 1899, but at that date it was only about 60 per cent completed, the expenditure amounting to \$1,968. The new work is 26 feet wide on top, from 14 to 20 feet high, substantially built of round-log, stone-filled cribwork of the usual type, battering 1 in 6 and close-sheathed vertically on the outer side, and battering 1 in 12 on the inner side. The outer end is also close-sheathed, and along the seaward face is a break 4 feet 6 inches high.

Total expenditure to 30th June 1900, including \$310.00 refund to Provincial Government, is \$4,328.56.

This work was transferred to control of Department of Marine & Fisheries on 12th June 1888.

## HAMPTON.

Hampton, Annapolis county, formerly Chute's Cove, is situated on the south-east side of the Bay of Fundy, 27 miles north-east of Digby Gut and 6 miles north-west from Bridgetown, an important station on the Dominion Atlantic Railway. It has a population of about 200 people, engaged in fishing, farming and the export of cordwood and timber.

In 1855 and 1856 a small pier 165 feet long was built near the western side of the cove, the provincial government contributing \$600 to its costs. The site was chosen by commissioners, apparently without professional advice and was objectionable on many accounts. In 1879, at a cost of \$3,000, an addition of 120 feet was made by the department, and the older portions of the work strengthened with the hope of remedying some of its defects of location.

In 1881, on further examination, it was found that the original work had been badly undermined by the sea, and that owing to the direction of the pier, the shingle was fast shoaling the water on the inside. It was therefore decided to rebuild the structure on another site about half a mile to the eastward, which was carried out at a cost of \$2,300. The new pier as then completed was 240 feet long, more substantially built, and much better located than the old one, it being situated immediately to the westward of the mouth of a small brook which serves to keep the schooner berth alongside free from sand. In 1888-9, it having been found that the stream had worked under the foundation, endangering the whole structure, the department expended the sum of \$750 in close-piling the entire inner face, levelling up the top of the work which had settled in places, putting in some additional ballast, and effecting general repairs to the covering and break.

In February, 1889, during a heavy freshet, the brook again gave trouble, tearing away its banks and the gravel beach and threatening to undermine the breakwater. In 1890-91, the department spent \$21 in repairing the damage and in turning the brook into its original channel. In 1892-93, the breakwater being found not quite long enough to afford a convenient berth for schooners, the department applied the sum of \$1,500.09 in constructing a block 40 feet long, 27 feet wide on top and 27 feet high on the outer end, and in repairing about 100 feet of the inner end of the old work, by raising the inner face, putting in new floor stringers and covering them with new planking, thus putting the work in a thorough state of repair.

In the year 1898-99, the sum of \$1,999.79 was expended in thorough repair of the breakwater. The whole top of the work for the outer 185 feet in length, 20 to 26 feet in width, was raised with new work for a height of from 2 to 4 feet, rendered necessary by the great and unequal settlement of the work caused by the scouring action of the little stream that discharges alongside and had made

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its way beneath it. To prevent a repetition, of this action, the inside face of the breakwater has been protected for a length of 80 feet with a puddle, wall faced on the outer side with 3-inch plank. The breakwater has a total length of 270 feet, a width of from 20 to 26 feet and a height, at the outer end, of 24 feet, where at high water ordinary spring tide, there is a depth of 21 feet of water. Spring tides rise 32 feet, neap tides 18 feet.

Total expenditure to 30th June 1900, including refund of \$1538.10 to Provincial Government, \$11,108.89.

This work was transferred to control of Department of Marine and Fisheries on 12th June 1888.

#### HANTSPORT.

Hantsport, Hants county, a prosperous village of about 1,500 people, is situated on the left or west bank of the Avon River, here a mile and three-quarters wide, about half way between Windsor, the county town, and the mouth of the river, where it enters the Basin of Minas. It is also an important station on the Dominion Atlantic railway, seven miles north-west from Windsor, and fifty-three from Halifax. The chief business of the place has been, in the past, the building, repairing and owning of large wooden sailing vessels. Although this has somewhat declined in late years, it is still of considerable importance, there being nearly 25,000 tons of shipping owned in the place. For eight months of the year a steamer runs to St. John, N.B., and intermediate ports; another small steamer runs to Windsor and other ports on the river. There being no public wharf in the place, the department decided to build, and a contract was awarded to Messrs. Simmons & Burpee, of Fredericton, on the 16th June 1897, for the construction for the sum of \$5,947. According to contract the work was to have been finished at the end of the fiscal year 1897-98, but, owing to unforeseen difficulties in procuring materials this could not be accomplished. It is a substantial structure of stone filled cribwork, about 200 feet long, 32 feet wide, with an outer face 64 feet long; at the outer end it is 26 feet high. At high water there is a depth of 23 feet along the outer face. The tides rise nearly 40 feet so that at low water there is no water near the wharf. At the close of the year 1897-98 the total expenditure was \$2,784.50 and the work was not completed before the fiscal year 1899.

Total expenditure to 30th June 1900 is \$6,439.63.

#### HARBOURVILLE.

Harbourville, Kings County, is situated on the south shore of the Bay of Fundy, 53 miles north-east from Digby Gut. The population of the settlement is about 200 people engaged in fishing and farming, the former being the staple industry. The harbour, which is only 400 long by 200 feet wide, and dry at low water, is formed by the mouth of Givan's Brook, and affords at high water complete shelter from storms from all quarters to vessels drawing up to 14 feet of water. The works here consist of two breakwaters or piers, one on either side to the entrance to the harbour. They were built many years ago, before Confederation, by the Provincial Government, when the shipping business of the place was considerably greater than it has been since the opening of the D. A. Ry. in 1868. The western breakwater was extended by the Department in 1876 at a cost of \$2,000, since which date numerous small expenditures, aggregating up to 1897 \$7,861.09, have been made in repairs and renewals to one or other pier. Both works are of open faced round log cribwork, their outer ends being close sheathed with flatted spars. In the fiscal year ending June 30th, 1900, the sum



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of \$2,399.90 was expended in general repairs and improvements. The work done consists of the widening of the outer end of the western breakwater to the full width of the rest of the work (45 ft.) and its extension one panel length (12 feet) also the extension of the eastern breakwater or wharf by a new piece 80 feet long and 20 feet wide designed to protect vessels lying at the breakwater. (Owing to the insufficiency of this year's appropriation, this latter piece of work still lacks about five feet of its proper and finished height).

Total expenditure to 30th June, 1900, including refund of \$323.00 to Provincial Government, \$10,634.91.

This work was transferred to control of Department of Marine & Fisheries on 12th June, 1888.

## HILTZ.

Hiltz's Narrows, Lunenburg County, form the entrance to a sheltered cove or lagoon of some 150 acres in extent, situated on the west side of Mahone Bay, about 6 miles south-west from Chester and 4 north-east from the village of Mahone Bay.

In 1875-76 the Provincial Government built a cribwork warping pier, 270 feet long, 8 feet wide and 7 feet high, on the north side of the entrance, which at its narrowest point is only 200 feet wide, to enable fishing boats to pass in and out at ebb and flood tide, when there is a very strong current.

During the year 1895 the department spent the sum of \$60 in repairs to this little structure. The work done consists of the rebuilding of a length of about 12 feet that had been broken down by ice, and the placing and bolting of 40 new fenders.

Some small repairs were also made in 1897.

Total expenditure to 30 June, 1900 is \$120.00.

## INGONISH

Ingonish Bay lies on the north-east coast of Cape Breton Island, about midway between Sydney Harbour and Cape North.

It is divided into North and South Bays by Middle Head, a narrow rocky and precipitous peninsula, over 2 miles in length. At the head of South Bay there is an extensive pond separated from the sea by a shingle and boulder beach through which there formerly existed a comparatively shallow channel, 60 feet in width with a depth of 5 feet at extreme low water, available for fishing boats at high water only.

In 1875 works were undertaken by the department for the improvement of the channel. On their completion in 1876 there was a channel 200 feet in width, with a depth of nowhere less than 14 feet, and with its northern side protected by a pier 500 feet in length, thus giving access for vessels to the pond, which has an area of about 400 acres and affords a safe and commodious harbour.

The pier, on which small sums were expended every year from 1876 to 1880, and larger amounts in 1881 and 1882, sustained serious damage during heavy easterly gales in 1882, and was subsequently carried away down to below low water.

In 1886-87 an anchor and mooring buoy were placed in the harbour near the entrance, and a beach protection work 58 feet in length was constructed on the north side of the entrance.

In 1893-94 the sum of \$1,143.73 was expended in the construction of a wharf near the entrance to the harbour, consisting of a block of cribwork 31½ feet wide on top and 30½ feet in length, with an approach of brush and stone 45 feet in length, and 20 feet wide on top. The depth at the outer end at extreme low water is 8 feet 3 inches.

During the fiscal year 1894-95 the sum of \$967.42 was expended in closing

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a breach at the back of the beach protection work on the north side of the entrance, by constructing a cribwork block 45 feet in length and 15 feet in width, and placing brush and stone at the sides.

During a great easterly gale accompanied by an extraordinary high tide, on the 4th February, 1895, the beach was swept from end to end. Nearly all the buildings and all the private wharfs were destroyed, but the public works were not disturbed with the exception of some settlement in the slope on the seaward side of the beach protection work.

Since 1882 the channel has decreased in width, but it has maintained its depth fairly well. It is still nowhere less than 100 feet in width, and has a depth of not less than 13 feet 6 inches at extreme low water.

Spring tides rise 5 feet.

Total expenditure to 30th. June 1900 is \$93,662.63.

#### INGONISH (NORTH BAY)

Ingonish, (North Bay) is on the north east or Atlantic coast of Cape Breton Island about midway between Sydney Harbour and Cape North. It is separated from the South Bay of Ingonish by a narrow and precipitous peninsula 2 miles in length. At the head of the South Bay, a good harbour was made in 1873-78 by improving the entrance to an extensive deep water pond.

On the 6th December a contract was entered into for the construction of a breakwater at Archibald's Point, on the north side of the North Bay, for the sum of \$27,250. The contract is for a work 484 feet in length, measured on a line running parallel to the southern or seaward face and distant 9 ft. therefrom, with an L 77½ feet in length measured on the centre line, of open face cribwork protected on the seaward face and the outer end by close sheathing, with sub-structure of creosoted timber. The depths at extreme low water will be, at the outer end 11 feet and over the sheltered area, from 8 to 5 feet. Spring tides rise 4 feet.

The work of construction was only commenced on June 13th, but good progress was made, and by the end of June about one eighth of the work under contract was in place.

Amount expended to 30th June, 1900 is \$3,784.34.

#### IONA.

Iona, Victoria Co., is on the northern side of the Grand Narrows, or Barra Strait, connecting the Great and Little Bras d'Or Lakes. It is a station on the Intercolonial Railway, and a landing place for Steamers of the Bras d'Or Steam Navigation Co.

A wharf 109½ feet in length, built by the Provincial Government in 1867, came under the charge of the Department and was reconstructed and extended in 1885-86. The extension consisted of a block 20 x 20 feet and an outer block or head 20 x 60 feet, with a span of 24 feet.

In 1891, it was observed that the outer block or head, had been affected by the ravages of the teredo, and that a bank of sand and gravel had formed round its southwest corner, subsequently the head became so delapidated as to render access to it impossible, except during perfectly calm weather.

Of the \$2,000.00 voted for expenditure during 1898-99, the sum of \$485.66 was expended in procuring the creosoted timber required in the construction of a proposed creosoted pile head over the outer block.

During the last fiscal year, the sum of \$1,514.53 was expended in constructing a creosoted pile head and in raising and repairing approach. The new head is 42 feet in width at the west end, and 22 feet at the east end; and 72 feet in length. The depth, at low lake level, at the outer face of the head, varies from 11½ feet

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at the west end (increasing to 14 feet in a distance of 10 feet from the face) to 18 feet at the east end.

Total expenditure to 30th June 1900 is \$6,012.90.

## IRISH COVE.

Irish Cove, Cape Breton county, is on the south-east shore of the Great Bras d'Or Lake, near the entrance to East Bay. The distance to the head of East Bay is 20 miles; to St. Peter's Canal, about 22 miles, and across the lake to Grand Narrows, 10 miles.

The wharf at this place, commenced in 1891-2 and completed the following year, is 160 feet 8 inches in length, and 20 feet in width, including a shore block 47 feet in length, a central block 20 feet 4 inches in length and an outer block 57 feet in length with an L 20 x 20 feet. The openings are respectively 17 feet 6 inches and 18 feet 10 inches. The depth at the outer end varies from 12 feet 3 inches to 13 feet at low lake level. It was strongly constructed, fully ballasted and had the exposed face of the outer block protected by close piling.

The amount expended in construction was \$3,245.94. There was no further expenditure up to the end of the fiscal year 1897-8.

During the fiscal year 1898-9 the sum of \$209.31 was expended in renewing part of the close piling of the outer block, all of which had been badly damaged or destroyed by the teredo. Four corner piles and fifty-four intermediate piles were placed and secured.

Total expenditure to 30th June 1900 is \$3,455.25.

This work was transferred to control of Marine and Fisheries on 12th Sept. 1892.

## ISLAND POINT.

Island Point, Victoria County, is on the south side of Boularderie Island, 18 miles west from the bridge crossing the Little Bras d'Or.

The wharf at this place built by the Government in 1886-87, is 120 feet in length and 20 feet in width, in blocks and spans. At the outer end a side block forms a head 41 feet in length. The depth at the outer end, at ordinary lake level, is 11 feet.

On examining the wharf in November, 1891, it was ascertained that the head had been struck by a field of ice in March, 1889, and the whole top down to 5 feet below water level moved 2 feet, the effect being to cause it to overhang, accompanied by a settlement of from 1 to 3 inches, to 2 feet 9 inches; and that the work below water was badly worm eaten.

During the fiscal year 1892-93 the sum of \$499.48 was expended in raising the head of the wharf to the general level of the approach; in replacing a small quantity of ballast; in close piling the west or overhanging face; and in renewing 5,700 feet b. m. of covering.

Total expenditure to 30th June 1900 is \$2460.13.

## JOGGINS.

"The Joggins," Cumberland county, is a small settlement of some three to four hundred people, situated on the south-east side of Chignecto channel, the northern arm of the Bay of Fundy. It is about ten miles from the head of Cumberland Basin, and fourteen miles from Macan station on the I. C. railway with which it is connected by the Joggins Railway built in 1889. About a mile to the east is situated the colliery of the Joggins Railway & Coal Company; the coal being brought down to the loading pier by means of a wire rope tramway. A breakwater, which protects the company's loading pier, was built over twenty years ago by the Joggins Coal company. In the year 1875 the department

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extended the head of the breakwater a distance of 120 feet; making its present total length 280 feet. In 1890 and 1891 it was repaired by the department at a cost of \$2,200 and \$1,000 respectively. In the year 1896-97 the sum of \$1,500 was expended in extensive repairs and renewals, and during the year 1897-98 the sum of \$399.28 was expended in completing the repairs. The floor, with stringers and guard timbers, was renewed for a length of 207 feet, 40 feet in length of the outer end was close sheathed and four new mooring post were placed in position. This breakwater is now in excellent condition.

Total expenditure to 30th June 1900 is \$15,070.67.

#### JOHNSON'S HARBOUR (HAY COVE).

Johnson's Harbour (formerly called Hay Cove), Richmond county, is an inlet of the Great Bras d'Or Lake, distant from St. Peter's Canal, 10 miles, and from the head of East Bay, 20 miles.

In 1881 the residents of the district built a wharf, 40 feet in length and 21 feet in width, at the eastern side of the harbour, near the entrance. In 1883-84, the department raised the wharf 2 feet in height, and placed a block 27 feet in length and 20 feet in width, against its southern face. In 1886-87 fender piles were driven along the side and channel faces, and the space between the south block and the shore was filled in. In 1893-94, the sum of \$759.76 was expended in cutting down the outer portion of the structure for a distance of 20 feet back from the channel face; in the construction of a cross-wall of cribwork 10 feet wide, and of pile-work extending 10 feet beyond the original channel face; and in filling in between the cribwork cross-wall and the shore.

The depth of low lake level, at the outer face of the pile extension, varies from 8 to 10 feet, increasing to about 15 feet at a distance of 10 feet beyond the outer face.

The expenditure by the department, up to the end of the fiscal year 1897-8, amounted to \$1,109.76, of which amount \$859.76 may be considered to have been laid out for construction and \$250 for repairs.

During the fiscal year 1898-9, the sum of \$10 was expended in slight repairs to the inner end of the southern face of the wharf.

Total expenditure to 30th June 1900 is \$1,119.76.

#### JONES HARBOUR

Jones Harbour is situated on the eastern side of the mouth of Sable River, and is distant by water about 12 miles east of Lockeport.

The harbour is small but well sheltered, having from 9 to 12 feet of water in the channel at low tide; it is much used by boat fishermen in the fall when the larger vessels have returned from "the banks." There is a strong tide in the harbour at certain times, and in 1888 the Department expended the sum of \$50 in placing 3 ring bolt moorings so that the fishermen could secure their boats in safety.

During the present fiscal year a landing wharf and breakwater have been constructed inside the mouth of the harbour to enable the fishermen to use a larger class of boats and also to give them landing facilities.

The wharf is 175 feet long and consists of an inshore end 90 feet long and 15 feet wide, built of large stone: a centre portion of cribwork which is the same width and 45 feet long, and an outer or channel block 40 feet long and 20 feet wide, also of cribwork. The cribwork sections are round timber, ballasted with large stone, fendered on all outside faces and have their surfaces covered with 3 inch plank. Spring tides rise 7 feet and there is 9 feet of water at the outer end of the wharf at low tide.

Total expenditure to 30th June 1900 is \$1047.99.

## JUDIQUE

Judique, Inverness Co., is on the east side of St. George's Bay, 10 miles south from Port Hood and 16 miles north from the entrance to the Strait of Canso.

A contract was entered into in April 1898 for the construction of a breakwater at McKay's Point, near the entrance to Judique Pond, for the sum of \$14,143. During the year 1898-99 the work was prosecuted vigorously and was in progress at the end of the year, when the whole of the substructure was in place with the exception of that of the outer 67 feet, and when the superstructure over the remainder was approaching completion.

The work under contract was completed and accepted on Nov. 2nd 1899.

The breakwater is 725 feet in length and 20 feet in width, on top, with an L at the outer end 20 feet in length, of open-faced cribwork fully ballasted, close fendered at the outer end, and protected on the north side by a talus of stone: the substructure is of creosoted North Carolina short leaf pine, and the superstructure of native timber. The depth at the outer end at extreme low water, is 6 feet 3 inches. Spring tides rise 4 feet 6 inches.

Total expenditure to 30 June 1900 is \$19,907.11.

## KINGSPORT (OAK POINT)

Kingsport, formerly Oak Point, King's County, is situated on the western shore of the Basin of Minas, between the mouth of the Cornwallis River and Cape Blomidon, and it is the eastern terminus of a branch of the Windsor and Annapolis Railway now under construction.

The original pier was 445 feet in length, and was owned and controlled by a pier company, which transferred it to the Crown in 1873-74. A cribwork facing, 12 feet wide, was built along the eastern or exposed side, for the purpose of breaking the force of the sea.

In March, 1875, a contract was made for the extension of the pier 270 feet, with a width of 30 feet, in order to increase the area sheltered and afford earlier access to the harbour which, owing to the great range of tides (from 40 to 43 feet), is dry between half ebb and half flood, and was completed in November 1875.

In 1883-84 some slight repairs were made to the older work, and in 1885-86 the covering which had become old and worn in places was renewed.

During 1887, 107 feet of the damaged face work of the breakwater was rebuilt.

In the autumn of 1888 it was found that the covering of the pile work section was so decayed that it was impossible for the farmers to reach the outer part of the pier with their loaded teams, and a plank driveway, 12 feet wide over the pile section, was begun in November and completed during the early part of the winter.

Total expenditure to 30th June 1900, including refund of \$1738.14 paid to Provincial Government, \$27,576.97.

This work was transferred to control of Department of Marine & Fisheries on 12th June 1888.

## L'ARDOISE

L'Ardoise, Richmond Co., is situated on the eastern side of St. Peters Bay near its entrance from the Atlantic Ocean, and about 9 miles from the southern entrance to St. Peters Canal.

An isolated breakwater built off Martin's Point, in from 5 to 10 feet at low water, in 1876-77, was almost entirely destroyed in 1883.

A contract entered into in 1891 for the reconstruction of the work was completed in August 1893. The new work consisted of a timber core, 400 feet in

length and 20 feet in width, placed over the remains of the former structure in from 1 to  $4\frac{1}{2}$  feet at low water, its top standing one foot above high water the whole being covered with stone sloping 3 to 1 on the seaward side. The whole surface of the work, above low water mark, was covered with stone of not less than 15 cubic feet, the spaces between the stones, above the line of high water, being filled in with cement concrete.

In 1894-95, the sum of \$4293.87 was expended in effecting repairs to the breakwater, the covering stones of the seaward and outer end slopes having been disturbed shortly after the completion of the work in 1883.

The expenditure up to the end of the fiscal year 1897-98 amounted to \$32,445.65, of which \$10,545 was expended in constructing and repairing the old work.

The covering stones on the seaward and outer end slopes having again been disturbed, the sum of \$3,500.—was appropriated for expenditure during the fiscal year 1898-99, in making up the slopes with extra large stones, and in constructing a concrete wall over the outer face and ends of the crib-work core,  $4\frac{1}{2}$  feet in height and 3 feet in width on top. Repairs were commenced in April (the large stone having been procured during the winter) and were in progress at the end of the year when the expenditure amounted to \$3,180.97. This expenditure was made in procuring 585 cub. yds. of large stone: repairing and fitting up derricks and scows, procuring 210 bls. Portland cement: and in constructing 120 feet of concrete wall and placing 285 cub. yds of large stone.

During the fiscal year 1899-1900, the sum of \$1,472.12 was expended in constructing 320 feet of concrete wall and in placing 300 cubic yards of large stone, thus completing the repairs undertaken in 1898-99.

Total expenditure to 30th, June 1900 is \$37,098.74.

#### LAWLOR'S ISLAND

Lawlor's Island, the quarantine station for the port of Halifax, is situated five miles in a direct line south-east from the city. It is  $1\frac{1}{2}$  miles long,  $\frac{1}{4}$  mile wide its highest point about 80 feet above high water, and it lies midway between the southern end of MacNab's Island and the mainland on eastern passage, in the southeastern part, or entrance to Halifax Harbour. It is well wooded and conveniently situated, and is admirably adapted for a quarantine station.

During the year 1892-93 the small landing wharf, 105 feet long by 15 feet wide, on the east side of the island, was repaired by day-work, at a cost of \$247.29. The repairs consist of a few new piles and caps and an entire new floor.

Owing to the necessity for enabling ocean steamers to land passengers on the island, conveniently, and undergo disinfection before proceeding to dock, a contract was entered into for the construction of a wharf on the north-west point of the island, which was brought to completion in November, 1895.

It is a pile structure throughout, 280 feet in length, with a head at its outer end 400 feet in length and 40 feet in width, having a depth of 27 feet along its face at low water, ordinary spring tides.

The pile bents in the stem, which is 30 feet in width, are 10 feet apart, and are composed of eight piles each, including brace and fender piles, the vertical bearing piles being 5 ft. 10-in. apart, centre to centre. The bents in the head of the wharf are also 10 feet apart, and have ten piles each, the vertical piles being 6 ft. 6 ins. apart between centres. All the bents, both in the stem and the head, are double cross-braced above low water, ordinary spring tides, with four 6-in. by 10-in. braces. The floor beams over the whole of the work correspond in number and spacing with the piles, and are 8-in. by 12-in. in section lapping a clear foot on, and well bolted to the 12-in. by 12-in. caps, and they are covered with a flooring of hemlock plank, 3 inches in thickness. Around the whole of the wharf a guard timber, 10-in. by 12-in. dimensions, has been placed and bolted at

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intervals of five feet,  $\frac{1}{4}$ -inch bolts. For mooring purposes 11 ring bolts and 13 mooring posts have been provided, and on the south-eastern side of the wharf, an easy flight of steps has been placed, reaching from extreme low water mark to the floor, which stands 7 feet above high water, ordinary spring tides, which rise 6 feet, and neap tides 5 feet. Expenditure during the year, \$5,202.50.

Total expenditure to 30th. June 1900 is \$5,202.50.

## LISMORE.

Lismore, Pictou County, is on the Strait of Northumberland, 10 miles to the eastward of the entrance to the harbour of Merigomish station on the eastern extension of the Intercolonial Railway.

A wharf, 197 feet in length and 20 feet in width, was commenced in 1886-87 and completed during the following year. In 1890-91 and 1891-92 it was extended a distance of 181 feet, thus making its total length, 378 feet. The structure has been built of round timber, is fully ballasted, and is protected by close fendering.

During the year 1894 it was found that the outer 37 feet, which had been built as a separate block, had moved outwards some 2 feet, leaving a space of 5 ft. between the cross-ties. The repairs executed consisted in tying this block to the remainder of the work with square timber placed on each side over the close fendering above the lines of low water, and stringers over the upper cross-ties, the whole being securely bolted. The 2 feet openings on each side were filled with timbers placed vertically and secured, and the space between the cross ties was filled with brush and stone. The cost of these repairs amounted to \$99.50.

The depth at the outer end at extreme low water is 3 feet 9 in. Spring tides rise 4 feet 6 in.

Total expenditure to 30th June 1900 is \$6,818.44.

This wharf was transferred to control of Department of Marine & Fisheries on 29th June, 1895.

## LITTLE BROOK.

Little Brook is situated on the thickly settled eastshore of St. Mary's Bay, Bay of Fundy,  $2\frac{1}{2}$  miles south from Church Point, 33 miles south of Digby, the County town, and 36 miles north of Yarmouth.

Some years prior to Confederation a breakwater was built here by the inhabitants aided by the Provincial Government.

In 1873 four blocks of cribwork in the middle of the work were partially destroyed by a gale, and the sum of \$600 from the Provincial "Navigation Securities" was expended in repairs.

In 1891-92 the sum of \$100 was expended by the Department in repairing the upper portions of the work which were considerably damaged by an exceptionally high tide in the autumn of 1890. A piece of 20 feet square by 5 ft. deep was rebuilt, and 100 tons of additional ballast placed in the work.

This breakwater, which is substantially built of stone filled cribwork of the usual type, is 400 feet long, 20 to 35 feet wide, and 20 feet high at the outer end, where there is an L 40 feet long by 25 feet wide. It is much used during the summer months for the shipment of piling, cordwood, lumber and timber, with small quantities of fish, and the landing of general merchandise and supplies for local trade and consumption. Little or no use is made of it during the winter owing to accumulations of ice. At high water of ordinary spring tides there is a depth of 15 feet of water at the outer end. At low water the sand flats are bare beyond the end for many hundred feet. Spring tides rise 21 feet neaps 17 feet.

Total expenditure by Department to 30th June, 1900 \$100.00

## LITTLE NARROWS

Little Narrows, Victoria county, is a contraction of the St. Patrick's channel of the Great Bras d'Or Lake at a point seven miles to the eastward of the village of Whycomagh.

The public wharf was built in 1897-98 on the south side of the narrows; it consists of a shore block 47½ feet in length, 20 feet in width, and a pile extension 82 feet in length with a return 40 feet by 20 feet at the outer end where a depth of 14 feet is available. The level of the lake is nearly constant.

The wharf is used by one of the steamers of the Bras d'Or Steam Navigation company plying between Little Bras d'Or, Baddeck and Whycomagh, and is a place of shipment for cattle and farm produce.

In August and September, 1897, a sum of \$499.65 was applied in partly reconstructing and repairing the pile wharf and in renewing the piles of three out of five bents of the approach and repairing the covering of the same.

Total expenditure to 30th. June 1900 is \$19,999.65.

## LIVINGSTON'S COVE.

Livingston's Cove, Antigonish Co., is on the Northumberland Strait a few miles to the westward of Cape George, and distant, by road, from McNair's Cove on St. George's Bay 3½ miles, and from Georgeville on the Northumberland Strait, 4 miles.

For the purpose of affording shelter for the fishing boats of the district and a landing place for steamers and small vessels, the sum of \$3,000.—was appropriated for expenditure during 1898-99, in procuring material to be used in the construction of a breakwater the estimated cost of which was \$6,000. The work proposed is to extend to 7 feet at low water and include: a road cutting 105 feet in length; an embankment with stone retaining walls and centre filling of brush, stone, and clay, 30 feet in length; and 80 feet of cribwork 10 feet in width, with a grade of 1 in 8; and a cribwork extension 160 feet in length and 24 feet in width with an L 24 x 24 feet.

During the year 1898-99 \$2,999.94 was expended in procuring nearly all the timber required for the proposed work, and about 700 cub. yds. of ballast.

During the last fiscal year \$2,962.40 out of the \$3,000—appropriated to complete the work was expended in constructing the road way, the stone and brush abutment, 80 ft. of cribwork, 19 feet in width, and 40 feet of the proposed 160 feet extension; and in procuring about 700 cubic yds. of ballast.

Total expenditure to 30th June 1900 is \$5,962.34.

## LOWER HORTON.

Lower Horton or Horton Landing, King's County, is a farming village of some 200 people on the left or north bank of the Gaspereau River, at the southern end of the Basin of Minas, and close to the village of Grand Pré.

It is also a station on the D. A. Ry., between Windsor and Kentville; being 14 miles from the former and 11 from the latter. About 60 years ago a landing wharf was built here by the inhabitants aided by the Provincial Government.

In 1887-88 this work, which is about 3 miles by water and 2 miles by land, west of that at Avonport, had become so decayed and dilapidated as to be quite useless for shipping purposes, and the department expended the sum of \$737.21 on repairs, and in 1888-89 the sum of \$2,252.25 in rebuilding it. The new wharf which is on the site of the old one, is constructed of round log open cribwork, 172 feet long, 65 feet wide at the outer, and 23 feet 6 inches at the inner end. The outer end is dry at L. W. owing to the great range of tide, 40 to 48 feet, but at H. W. vessels drawing 18 feet can reach it.



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During the year 1896-97 the sum of \$270.25 (appropriation \$235.00) was expended in a few much needed repairs. The work done consists in the re-flooring of the shore-ward half of the wharf, together with the placing of new guard timbers and a few new floor stringers, and the building of two small pieces of cribwork, about 15 feet long, 6 feet wide, and 4 to 5 feet high, one on either side of the shore end of the wharf to prevent the bank from wearing away. The work is now in good condition.

Total expenditure to 30th June 1900 is \$2,989.59.

## LOUIS HEAD.

Louis Head, Shelburne County, is a thrifty little fishing settlement of about 100 people situated on the western side of the mouth of Sable River about 17 miles east from Shelburne, the county town, and 10 miles from Lockeport.

In 1892, the department built a breakwater here for the purpose of forming a shelter for fishing boats and small vessels, and to serve also as a landing wharf for general purposes.

The work which was built close against the remains of an ancient wharf (subsequently removed) is 150 feet long, 20 feet wide, and 22 feet high at the outer end, where at H. W. O. S. T. there is a depth of 18 feet of water. Springs rise  $7\frac{1}{4}$  feet. Neaps  $5\frac{3}{4}$ ).

The whole structure is very strongly built in order to resist the heavy seas from the S. E. to which it is much exposed. It is of close-faced square timber cribwork throughout, double fendered and full ballasted. The seaward face slopes 1 to 1 from the level of the floor to 2 feet above L. W. O. S. T., and is covered with 6 inch birch plank. The outer end as well as the seaward face is protected with a toe of heavy rip-rap. The breakwater was built by contract and cost \$4,440.22.

At its session of 1898 Parliament made an appropriation of \$600 for the removal of the dilapidated portions of an old pier of cribwork 235 feet long by 12 feet wide to the northward of the breakwater and the extension of the same. This old work was built by the local authorities to protect the beach that shelters a small cove or boat harbour on its inner side.

During the fiscal year 1898-99 a sum of \$590 had been expended in renewing the old pier for an average height of 6 feet, and adding a pier of new cribwork 46 feet long, 10 feet wide and 8 feet high. The extension was built with the view of more effectually protecting the beach from the undertow that sweeps around the end of the work; during heavy storms; this was so heavy as to threaten the entire destruction of the cribwork and beach combined.

Total expenditure to 30th June 1900 is \$4,440.22.

## MABOU.

Mabou Harbour, Inverness county, is on the west coast of Cape Breton Island, six miles north-east from Port Hood.

The entrance was formerly at the southern extremity of a range of sand hills and by an intricate channel obstructed by a bar, over which there was a depth of only 4 feet at low water.

In 1870 a survey was made and a report submitted on the project of opening a channel through the sand-hills at their northern extremity.

The work was commenced in 1872. A pier on the south side of the new channel was completed in 1876, and the same year the old channel was closed. Expenditures were made nearly every year from 1876 to 1894, in repairs to the pier, the construction of brush and stone works on the south side and of protection works on the north side of the channel and in dredging.

During the year 1897-98 the sum of \$1,999.96, was expended in repairing the

protection works on the north side and in raising the brush and stone work on the south side of the channel.

The minimum depth at extreme low water in the new channel is 8 feet 3 inches. Springs tides rise 4 feet.

Total expenditure to 30th June 1900, including dredging, \$154,358.57.

#### MALIGNANT COVE

Malignant Cove, Antigonish Co., is on the Northumberland Strait, about midway between Arisaig and Georgeville, and distant from each about 4 miles.

The sum of \$5,000 was appropriated for expenditure, during 1899-1900, in opening a channel for boats into a small pond at the head of the Cove, and in constructing protection works. During the year a plan and specification for works extending, outside, to 7 feet at low water were prepared, and the sum of \$3,893.35 was expended in procuring the materials required in the construction.

The works proposed include the construction of piers placed 60 feet apart on each side of a channel, to be excavated to 2 feet at low water. The piers extending 248 feet inwards from low water outside, to be 10 feet in width and to be founded at low water. Those extending 90 feet from low water outwards to be 16 feet in width over 60 feet from their inner ends, and 22 feet in width over the outer 30 feet.

#### MARGAREE.

Margaree Harbour, at the mouth of the Margaree River, Inverness County, is on the west coast of Cape Breton Island, about 30 miles north-east of Port Hood. It has a narrow and intricate channel through which the tides run at the rate of 4 knots, and its entrance is obstructed by a bar of shifting sand, over which there is at times a depth of only 5 feet at extreme low water. Spring tides rise 4 feet.

A pier constructed on the west side of the entrance to the harbour by the Provincial Government, prior to Confederation, was repaired and extended by the department in 1876, in 1879, and again in 1890; the first extension being 85 feet, the second 130 feet and the last 200 feet in length.

The expenditure up to the end of the fiscal year 1897-98 amounted to 816,554.92, of which \$274.83 was refunded to the Local Government, \$12,901.67 was for extending and repairing the pier and \$3,378.42 for protecting the beach on the eastern side of the entrance to the harbour.

In February, 1898, a contract was entered into for the construction of a further extension of 180 feet, 20 feet wide on top over a distance of 156 feet from the inner end, and 24 feet over the remaining 24 feet, with faces battering 1 in 6.

The work was commenced early in July and completed and accepted on Dec. 23, 1898. It is constructed of round timber, open-faced with ties, of round timber; the corners are fendered, and all the faces are close sheathed with hardwood timber. For a distance of 156 feet, the top of the covering is 4 feet, and for the remaining distance of 24 feet it is 5 feet above assumed high water.

An expenditure of \$4,051 was incurred in 1898-9 in connection with the extension of the pier.

Besides the construction of the extension, the sum of \$178.66 was applied during the months of October and November, 1898, by day labour, in placing 88 cubic yards of large stone in face chambers of work built in 1890, and in removing and replacing covering, and reballasting 44 feet of inner end of the old work, and in reconstructing the approach thereto.

Total expenditure to 30th June, 1900, including refund of \$274.83 paid to Provincial Government, \$20,784.58.

MARGAREE ISLAND

Margaree Island is situated in the Gulf of St. Lawrence 2½ miles off the western coast of Cape Breton Island, 27 miles north-east from Port Hood.

The sum of \$2,000, was appropriated for expenditure during the fiscal year 1899-1900, in the construction of a wharf at Margaree Island.

A plan and specification were prepared for a wharf 20 feet in width, to extend 98 feet, to 8 feet 6 inches at extreme low water.

The whole of the amount appropriated was expended before the 30th June in procuring the materials required, and in making preparations for construction.

MARGARETVILLE

Margaretville is on the south shore of the Bay of Fundy, in Annapolis County, and about 42 miles east of Digby Gut. A pier was begun here in 1837 by the Provincial Government, and subsequently extended to a length of 471 feet. When taken in charge by the Department in 1871 it was found to be much damaged by sea-worms and in need of extensive repairs, which were made in the two following years at a cost of \$3,650.

In 1876 a further amount of \$5,000 was expended in extending the pier, and in 1879 \$5,000 in repairs.

This is one of the two places selected as eligible for the formation of a harbour of refuge. Harborville, thirteen miles to the eastward, being the other.

Margaretville, Annapolis county, is the largest and most important village on the south coast of the Bay of Fundy from Digby Gut to Scott's Bay. It is 42 miles from the former, 36 from the latter, and 8 miles north from Middleton, which is an important station and junction of the Dominion Atlantic railway. The village has a population of about 500 people engaged in fishing, farming and to a small extent in lumbering operations and general trade. In March, 1897, the department awarded a contract for the reconstruction of the outer 185 feet in length of the work that was totally destroyed by gales in October, 1890 and March, 1894. Amount of contract, \$10,854. During the year ended 30th June, 1898, the work was completed, the total expenditure amounting to \$6,474.20. The new block is 185 feet long, 42 feet wide and from 22 to 32 feet high. It is well and substantially built of stout filled cribwork of the usual type. The pier has now a total length of 425 feet and reaches a depth of 28 feet at high water ordinary spring tides, which rise about 30 feet.

The work being high and dry at low water for most of its length, it receives very little injury by worms but its exposed position on a straight open coast subjects it to the onslaught of heavy seas from N. W. to N. E.

Total expenditure to 30th June 1900, including refund of \$694.67 to Provincial Government, \$35,284.66.

This work was transferred to control of Department of Marine & Fisheries on 12th June 1888.

MAITLAND.

The village of Maitland, Hants county, with a population of about 1,500, is situated on the west side of the mouth of the Shubenacadie River, which enters Cobequid Bay on its south side. The bay is the eastern extension of the Basin of Minas, a large and important estuary of the Bay of Fundy. A public wharf was built here by the department between 1873 and 1876 at a cost of \$6,342, and a further sum of \$2,142.76 has been expended for repairing this structure. Communication with Truro, the county town of Colchester county, is by public road, but the Shubenacadie River, at this point over half a mile wide, must first be crossed by means of a ferry available the year round, except for the few winter months. On the Hants county side the ferry boat has always landed on the

beach, and, at low water, considerable trouble is experienced in getting passengers and teams to and from the ferry boat.

To facilitate the crossing of the river, the department expended during the year 1897-98 the sum of \$996.76 in constructing a ferry wharf of cribwork, 170 feet long and 20 feet wide. In the year 1898-99, the sum of \$202.45 was expended in finishing the work, or rather in extending the inclined slip a further distance of about 50 feet, so as to take it out to the level of the beach in order that the horses and teams might be driven from the beach on to the wharf. The work is partially an extension and reconstruction of an old private wharf, but its location at the foot of a public street makes it entirely a public work.

Total expenditure to 30th June 1900 is \$8,933.38.

This wharf was transferred to control of Department of Marine and Fisheries on 22nd January 1885.

#### MC NAIR'S COVE, N.S.

McNair's Cove, Antigonish county, is on the west side of St. George's Bay, 2 miles south of Cape George.

A breakwater 400 feet in length was built on the north side of the Cove in 1872-73. Repairs were effected from time to time up to 1887-88, when the work was reconstructed over a distance of 160 feet from the outer end.

During the years 1890-94, the outer end of the work reconstructed in 1887-88 was protected by close-piling of creosoted timber, and its seaward side by a talus of quarried stone. In 1896-97 a small amount was expended in raising the talus, which had settled so as to leave portions of the damaged face work exposed.

In 1897-98 the sum of \$499.80 was expended in placing additional stone on the talus and in reballasting face-chambers on the seaward side, where the ballast had gone out through the damaged face-works; and a further sum of \$199.56 was expended in procuring timber to be used in repairs rendered necessary by damages sustained after the repairs above referred to, had been effected.

During 1898-99, the sum of \$893.56 was expended in effecting the repairs, for which the timber was procured in 1897-98. The repairs consisted in cutting away, for a distance of 80 feet of the timber wall under the sloping face (which had been partially destroyed by the teredo), back to the first tier of longitudinal, and in sheating the new face with hardwood sheathing 10 inches square; in raising the stone in the talus; in reballasting face chambers back of damaged face and in refastening the covering where required.

During the last fiscal year the sum of \$574.21 was expended in further repairs to the outer end of the work. The repairs included sheating of 53 feet of the outer face with hardwood, in placing 80 cubic yards of ballast in outer face chambers and 300 cubic yards of quarried stone in the talus, and in renewing the cap timber and three tiers of face timbers over a distance of 40 feet on the inner face, near the outer end.

The depth of water at low water, at the outer end, is 13 feet. Spring tides rise 4 feet.

Total expenditure to 30th June 1900 is \$65,466.86.

#### MC NUTT'S ISLAND.

McNutt's Island, Shelburne County, is situated at the mouth of Shelburne Harbour  $8\frac{1}{2}$  miles on an air line south by west from the county town. It is 3 miles long and  $1\frac{1}{2}$  miles wide. On its southern extremity are a lighthouse and fog whistle. Projecting in a westerly direction for a distance of nearly half a mile from the northern extremity of the island is a horse-shoe shaped beach or bar of gravel and shingle, forming on its southern or concave side a valuable and

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much frequented harbour for fishing boats and small craft of all sorts. A few years ago a severe gale made a breach through the bar. At first this was 100 ft. wide but it gradually widened to about 200 feet in width in 1898.

In order to prevent the total washing away of the beach and the destruction of the only haven of refuge in Shelburne harbour available during southerly gales, the closing of the breach and protection of the beach by cribwork fully ballasted to the top was undertaken in 1898-9.

The length of cribwork built is 265 feet, the width 9 feet, and the average height  $5\frac{1}{2}$  feet. Besides this, the top of the beach for a farther distance of from 200 to 300 feet has been protected by cribwork from one to two logs high.

Total expenditure to 30th June, 1900 is \$638.11.

## MERIGOMISH.

Merigomish Harbour, Pictou County, is on the Northumberland Strait 10 miles to the eastward of the entrance to Pictou Harbour. The depth at low water, over the bar at the entrance, is 14 feet. Spring tides rise  $5\frac{1}{4}$  feet, neaps  $3\frac{1}{4}$  feet.

In 1880, a wharf was built by the Department in a Cove to the eastward of Hardwood Point, and about one mile from Merigomish station on the Intercolonial Railway. It was 154 feet in length and 20 feet in width, on flats dry at extreme low water to the outer end, and consisted of an approach 70 feet in length of earth with stone side walls, and 84 feet of block and span work.

The expenditure up to the end of the fiscal year 1897-98, amounted to \$1,140.40. The sum of \$900 was appropriated for expenditure during 1898-99 in extending the wharf; of the above amount, \$647.03 was expended in procuring the materials required for a proposed 100 feet pile extension over a soft bottom to one foot at extreme low water, and in completing the extension with the exception of placing some of the guard rails, walings and braces.

During the fiscal year 1899-1900, the sum of \$252.26 was expended in completing the extension, in placing brush and stone over the bottom to serve as an ice break, and in slight repairs to the old work.

Total expenditure to 30th June, 1900 is \$2,039.66.

## MERIGOMISH (BIG ISLAND)

Big Island, Merigomish, Pictou Co., is on the Northumberland Strait about 10 miles to the eastward of the entrance to Pictou Harbour. It is  $3\frac{1}{4}$  miles in length and  $1\frac{1}{8}$  miles in width and is connected, at the eastern end, with the mainland by a sand bar  $2\frac{1}{2}$  miles long, excepting during unusually high tides when the sea washes over the bar into the harbour of Merigomish, the eastern portion of which is within the Island.

A contract was entered into in March 1899 for the construction of a wharf on the eastern side of the Island nearly opposite the public wharf on the mainland, for the sum of \$865.

During the fiscal year 1899-1900 the work under contract was completed. It consists of a road cutting and embankment respectively  $65\frac{1}{2}$  and  $9\frac{1}{2}$  feet in length; and a block and span structure 20 feet in width extending 95 feet to 2 feet 6 inches at extreme low water, consisting of an abutment of stone 27 feet in length and two blocks of cribwork. Spring tides rise  $5\frac{1}{2}$  feet.

## METEGHAN RIVER.

Meteghan River, Digby County, empties into the Bay of Fundy at the mouth of St. Mary's Bay, almost directly opposite Grand Passage, between Long Island

and Brier Island. It is 20 miles south of Weymouth, 28 miles north of Yarmouth and  $2\frac{1}{2}$  miles north of Meteghan or Meteghan Cove. The population of the village is about 400 people, engaged in farming, fishing, lumbering and general trade. The nearest Railway station on the Dominion Atlantic Railway, which runs parallel with the Bay shore, is about four miles from the village. On the river, which is about 18 miles long, are some 20 saw mills most of which send lumber down to the mouth of the river for export to the West Indies and the United States, the total annual output aggregating over a million feet B. M. The works here which were built some years before confederation, presumably at the joint expense of the Provincial Government and the inhabitants, consists, of two breakwaters, one on either side of the mouth of the river, and enclosing an area of about three acres, in which, at H. W. O. S. T., is a depth of from 10 to 15 feet, giving ample berth accommodation and complete shelter to a large number of coasting and fishing vessels. Spring tides rise 21 feet, neaps 17 feet. The north breakwater is about 400 feet long, 24 feet wide and 13 feet high at the outer end; they are both built of stone-filled cribwork of the usual type. When the works came under charge of the Department the older portions were much decayed, and extensive repairs were needed, which were made in 1873 at a cost of \$4,500.00. In 1881 the sum of \$2,000.00 was expended in rebuilding and repairing parts of both breakwaters. In 1882-83 the sum of \$3,000.00 was expended in close-piling and extending for a length of 80 feet the south breakwater, in general repairs to the northern breakwater, and in removing from the dock a quantity of rocks and boulders, which was used as ballast in the new work. In 1890-91 \$265.19 was expended in removing from the channel, near the shore end of the south work, some more rocks and boulders that interfered with the keels of vessels lying alongside; slight repairs were also made under the same appropriation to both breakwaters. In 1898-99 the sum of \$4,001.76 was expended in extensive renewals to the shore end of the south breakwater. The work taken down and rebuilt was 400 feet long, with an average width of 29 feet, and an average height of 13 feet. This length was also newly close-sheathed, and on the shoreward side of the same portion a new break was built 276 feet long and 6 feet high. In the fiscal year 1899-1900 the sum of \$4,199.98 was expended in continuing the work of restoration of the main breakwater, a length of 216 feet of the shore end of the work adjoining outwardly a portion of the work renewed the previous year was taken down and thoroughly rebuilt.

Total expenditure to 30th June 1900, including refund of \$1,283.33 to Provincial Government, \$21,940.94.

This work was transferred to control of Department of Marine and Fisheries on 12th June 1888.

#### METEGHAN.

Meteghan Cove, Digby County, is situated on the south side of St. Mary's Bay, 25 miles north of Yarmouth, 20 miles south of Weymouth,  $2\frac{1}{2}$  miles from Meteghan River and 40 miles from Digby the county town. The nearest Railway station on the Dominion Atlantic Railway, which runs approximately parallel to the coast and has its terminus at Yarmouth, is about 7 miles distant. Ordinary spring tides rise about 21 feet and neaps 18 feet. The whole coast of St. Mary's Bay from Digby to Yarmouth is thickly settled, and is, in fact, almost one continuous straggling village for the whole distance of 65 miles. Meteghan, next to Digby and Weymouth, is the largest and most important settlement on the Bay shore, having a population of 1,000 people, engaged in farming, fishing, lumbering and general trade. The works at this place consist of a breakwater and landing pier, both of cribwork, built from 40 to 50 years ago by the Provincial Government and the inhabitants. The pier is about 300 feet long by 20 feet wide, the breakwater, 20 to 26 feet wide runs out for a distance of 925 feet from

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the shore, and has a return, or L, of 85 feet at the outer end, which is 24 feet wide and 30 feet high, standing in from 25 to 27 feet depth of high water ordinary spring tides. In 1875, at which date the work appears to have been taken over by the Department, the breakwater was extended and repaired by the Department at a cost of \$1,000.00. In 1878 an additional length of 100 feet was built together with a portion of the ell at the outer end, at a cost of \$3,000.00 and in 1881 the sum of \$2,250.00 was expended in still further improving the structure by constructing an additional length of 50 feet on the ell. In 1882-83, the sum of \$500.00 was expended in re-ballasting and close piling portions of the work and in other miscellaneous necessary repairs. In 1883-84 \$32.00 was expended in securing some of the fenders and a portion of the flooring at the outer end. In 1884-85 some damage caused by the severe gale of the previous November was made good at a cost of \$96.64; a breach 25 feet long and from 4 to 6 feet deep was refilled with solid work, 40 feet of new break was added, and some new ballast put in to replace that washed out; in 1887-88 the seaward face of the breakwater was close-sheathed for 700 feet in length; 575 feet on the inner face was repaired and sheathed, the whole work levelled up and some minor repairs executed. The expenditure this year was \$1,447.33, which, in the departmental report for the year, is given as a refund to the Provincial Government on account of monies expended by them between 1867 and 1879. In 1892-93 the department expended the sum of \$299.72 in making some slight repairs to the breakwater and in temporary repairs to the landing wharf. In 1893-94 the sum of \$2,627.54 was expended in making thorough repairs to the landing pier and wharf, the work done consisting of the rebuilding and face fendering of the outer block 50 feet long, building a new top and back 8 feet thick to the next length of 16 feet and thoroughly refendering and capping the remainder of the work a length of 260 feet. In 1897-98 the sum of \$3,141.99 was expended in constructing a reenforcing block along the whole length of the outer face of the ell of the main breakwater. This work which was rendered necessary by the eating away of the bottom timbers by the limnoria, and the subsequent settlement of the breakwater, is 100 feet long, 12 feet wide and 22 feet high. The upper portion of the ell was also built 35 feet wide and 4 feet high, which restored it to the height of the rest of the work. The new work is thoroughly well and substantially built of round-log cribwork, well fendered, ballasted and close-sheathed on all exterior faces. In 1898-99 the sum of \$1,093.20 was expended in renewing a length of 120 feet, by 8 to 10 feet in height and by 8 to 10 feet in width, on the lower portion of the outer end of the seaward face of the breakwater, which had been eaten away by the limnoria; the work was close-sheathed for the same distance, and for 40 feet on the inner side, about 10 feet in length of flooring was also renewed. A breach 30 feet long on the seaward side, adjacent shorewards to the 120 feet before mentioned, was also rebuilt. In the fiscal year 1899-1900 the sum of \$2,000.00 was expended in extensive renewals and repairs to the breakwater, the work done consisting of the rebuilding of 100 feet in length of the seaward face and 90 feet of the inner or shoreward face, about 8 feet wide, from top to bottom of the work, placing top cross logs all across the breakwater to tie the new portions together and a new floor on the portions renewed.

Total expenditure to 30th June 1900, including refund of \$1,447.33 to Provincial Government, \$26,748.50.

This work was transferred to control of Department of Marine and Fisheries on 12th June 1888.

## MILITIA POINT.

Militia Point, Inverness county, is situated on the north shore of the Great Bras d'Or Lake.

For the accommodation of the trade of the locality, and to afford a landing

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place for the steamers plying on the lake, a wharf 150 feet in length was constructed in 1884, having 12 feet water at its outer end.

Total expenditure to 30th June 1900, including refund of \$684.00 to the Provincial Government, \$2,684.

This wharf was transferred to control of Department of Marine and Fisheries on 12th June 1888.

## MILL CREEK.

Mill Creek Cape Breton county, is a small farming settlement of some two or three hundred people, situated on the western side of the Basin of Minas, three miles south of Cape Blomidon, about four miles north of Kingsport, the terminus of the Cornwallis Valley Railway, a branch of the D. A. R. Some twelve or fifteen years ago the inhabitants, for their own convenience and accommodation in the shipping of fruit and farm produce, built a small pile wharf, but, their available means having given out, they were unable to finish it. The unfinished wharf was 160 feet long and from 20 to 25 feet wide, built of pile work. During the fiscal year 1899-1900 the Department expended the sum of \$1904.18 in extending and completing this old wharf. The new work is 79 feet long in line with the old, with an L at right angles to it with a face length of 93 ft. The main portion of the new work is 30 ft. wide, the L being 25 ft. wide. The new work is substantially built of pile work, and close piled on the west and south faces. It is 20 feet high along the whole length of the face, giving about 17 feet of water at H. W. O. S. T. Spring tides rise here nearly 50 feet, so at low tide there is no water within a quarter of a mile of the wharf.

Total expenditure to 30th June 1900 is \$1,904.18.

## MOIDART

Moidart, Antigonish County, is on the Northumberland Strait, 3 miles west from Arisaig.

In 1887-88 a landing place for boats was made by levelling off the top of a large rock and constructing a narrow approach 73 feet in length of stone, with cribwork top. The approach was destroyed during a succession of northerly gales in October, 1890.

In 1891 the remains of the old work had been removed and a new approach 75 feet in length, 16 feet in width and 6 feet in average height, constructed of round timber, full ballasted, covered and fendered.

The depth at extreme low water at the east side of the rock is 2 feet. Spring tides rise 5 feet.

Total expenditure to 30th June 1900 is \$890.06.

## MONDAY POINT.

Monday Point, Cape Breton County, is on the southern side of Boularderie Island,  $3\frac{1}{2}$  miles to the westward of the Little Bras d'Or bridge.

A contract was entered into in April, 1894, for the construction of a wharf 160 feet in length, consisting of a stone embankment 20 feet wide on top, the sides having a slope of one and a half to one; and a cribwork head 22 by 44 feet.

The substructure of the cribwork head was framed in June, 1894, but at the close of that month no portion of the work had been put in place.

During the fiscal year 1894-95 the work under contract was completed.

The depth at the outer end of the wharf is 11 feet at low, or 12 feet at high lake level.

Total expenditure to 30th June, 1900 is \$2,965.56.

This wharf was transferred to control of Department of Marine & Fisheries on 17th June, 1900.



## MONK'S HEAD.

In 1894-5, a channel for boats was opened between Dunn's Lake and Antigonish Harbour, and a highway bridge was constructed over it. After the completion of these works, the current cut into the slopes and undermined the bridge abutments which settled considerably.

During the years 1896-7 the sum of \$300 was expended in repairs to the bridge and abutments, and in the construction of about 60 feet of brush and stone work on each side of the channel, in continuation inwards of the brush and stone work in the bridge abutments; the superstructure of the bridge was removed and renewed after cutting back the abutments so as to increase the width of the opening from 14 to 18 ft. and facing them with five piles capped with 12-inch square timber; and five piles were driven on each side at the face of the brush and stone work, over a distance of 20 feet from the bridge.

The expenditure up to the end of the year 1897-8 amounted to \$1,021.57.

During the fiscal year 1898-9 the sum of \$272.45 was expended in completing the repairs to the bridge, in improving the approaches, and in extending the brush and stone protection work for a distance of about 140 feet on each side of the channel.

Total expenditure to 30th June, 1900 is \$1,294.02

## MORDEN

Morden, Kings County, formerly called French Cross, is a small fishing and farming village with a population of about 120 people, situated on the south shore of the Bay of Fundy, 50 miles east of Digby Gut, and nine miles north from Aylesford station on the D. A. Ry. Since the opening of the D.A. Railway in 1868 its population and business have decreased to half their former proportions. The pier or breakwater of this place, which is the most westerly in Kings County, was begun in 1846 at the joint expense of the inhabitants and the Provincial Government. It was built of round log cribwork, filled with ballast, and close sheathed on the seaward side and outer end. It is 26 feet high at the outer end. In 1874 the Department spent the sum of \$3,000, in building a spur block on the north side of the wharf to prevent the gravel from washing round the end and filling up the dock, and in effecting other repairs. (Afterwards this block had been totally demolished and swept away). In 1878-79 the pier was widened, and a new block, 20 feet long, constructed on the end at a cost of \$2,500. Since this date the following expenditures have been made in general repairs and renewals:

1885-86.....	\$ 50.00
1886-87.....	400.00
1891-92.....	300.00
1892-93.....	259.67
1893-94.....	49.91
1896-97.....	1963.81
1897-98.....	1992.75
1898-99.....	498.80

In the year 1899-1900 the sum of \$1,533.02 was expended in rebuilding to the full height of the breakwater 68 feet in length of the buttress on the seaward face of the work which was damaged and partly separated from the main body of the work by the storms of the previous winter. This work was no sooner finished than the exceptionally severe gale with the tremendous seas of November 12th and 13th, 1899, broke and destroyed 75 feet in length of the inner or shoreward side of the breakwater, immediately abreast of the new seaward face. No work

has been done upon the breakwater since, and it is now in a very dangerous condition.

Total expenditure to 30th June 1900, including refund of \$60, to Provincial Government, \$12,628.12.

This pier was transferred to control of Department of Marine & Fisheries on 12th June 1888.

#### NEGRO ISLAND.

Negro Island, Shelburne County, is situated at the entrance to Negro Harbour, and is about mid-way between Shelburne Harbour and Cape Sable.

The island, which is higher than the neighbouring coast, is divided into two nearly equal sections, the only connection between them being a narrow neck or spit of sand or gravel, about one-quarter mile long, which is dry at all times of tide.

This neck, besides being the roadway between the two portions of the island, forms a natural breakwater to the small harbour where most of the small fishing boats of the island are kept. The southern side of this neck or spit is at times exposed to a heavy sea, and for some years its crown has been wearing away, until about five years ago the tide began to ebb and flow over it.

Some years ago the inhabitants becoming alarmed that both the harbour and roadway would be destroyed, obtained assistance from the local authorities and built a piece of beach protection work, 100 feet long over the lowest part of the spit.

The beach on either side of this piece of work, being dangerously low, the Department, extended the beach protection and repaired the former work.

The new work is 189 feet long and 12 feet wide, and is built of round logs, with cross ties at every 10 feet. It averages 3 feet 9 inches high; has a continuous ballast floor laid on the bottom tier of longitudinals, and is filled to the top with stone ballast. The protection work now extends over the whole length of the low beach, and the spit appears to be fast building up to its original height.

Total expenditure to 30th June, 1900 is \$703.36 of which \$403.36 is for beach protection.

#### NEW HARBOUR.

New Harbour Cove, Guyboro' County, is on the east or Atlantic coast of Nova Scotia, 30 miles to the westward of Canso Harbour. It is merely a shallow bay opened to the south-south-east. At the head of the Cove is the entrance to St. Catherine River which is navigable for boats 5 miles inland.

During the fiscal year 1899-1900, a contract was entered into for the construction of a breakwater at Black Point on the western side of the Cove, for the sum of \$17,070.00. The work under contract includes the construction of 240 feet of stone embankment, and 150 feet of cribwork 25 feet in width with creosoted sub-structure.

Operations were commenced in May, and were in progress at the end of the fiscal year, when 160 feet of the stone embankment was approaching completion.

Total expenditure to 30th June, 1900 is \$1,308.59.

#### NOEL.

Noel, Hants County, is a village of about 500 people, situated on the south shore of Cobequid Bay, the extreme eastern arm of the Bay of Fundy. It is 13 miles west of Maitland and 32 north-west from Shubenacadie, the nearest Railway Station, on the I. C. Ry. Spring tides rise here 50 feet and neaps 43 feet.

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A pile work wharf 230 feet long and 25 feet wide, with an L 62 feet long, was built by the department in 1889 at a cost of \$27,000.

In June, 1897, the sum of \$100.00 was expended in re-laying with 3 inch hemlock plank the shoreward 150 feet in length of the floor, which was in an advanced state of decay. The rest of the floor will require renewal within a short time. The wharf is in other respects in fair condition.

This wharf was transferred to control of Department of Marine and Fisheries on 5th October 1898.

## NORTH WALLACE.

Wallace Harbour, Cumberland County, is situated on the south side of the Straits of Northumberland, about midway between Pictou Harbour and Bayfield. It is at the mouth of Wallace River, and is well sheltered from all winds.

On the south side of the harbour, which is about three quarters of a mile wide, is the village of Wallace with a population of about 800 people. The industries of the place are chiefly farming and the quarrying and export of freestone, of which there are large and valuable beds in the immediate neighbourhood.

Opposite the village, on the north side of the harbour, a landing was constructed many years ago to accommodate the ferry services across the harbour, but as it was only available at and near high water, the department in 1879 dredged a channel through the mud flats from the main channel of the river to the landing, a distance of about 1,600 feet, with a width of 45 feet and a depth of 7 feet at low water of spring tides which rise here 7 feet. The expense amounted to \$9,998.25. The channel having silted up to a considerable extent, owing to its being nearly at right angles to the tidal flow, the department cleared it out in 1887 at a cost of about \$2,000.

To prevent the inner end of the cut from silting up, and to afford at the same time shipping facilities to the inhabitants of North Wallace and Fox Harbour, the department in 1888-9 began the construction of a wharf starting from the end of the public road and running past the remains of the old ferry landing on to eastern or seaward side of the cut, the length constructed being 165 feet and the outlay \$999.38.

In 1889-90 the sum of \$2,578.41 was expended in extending the wharf a distance of 180 feet along the seaward side of the cut 20 feet wide, with an L on the outer end 20 feet long and 20 feet wide.

The total length of the wharf is now 345 feet, of which the outer 180 feet, being along the edge of the dredged channel, can be used by small craft for the purposes of loading or unloading merchandise.

In the fiscal year 1898-9 the sum of \$747.54 was expended in constructing an inclined ferry slip of pile work on the western side of the wharf. The slip is 121 feet long, 15 feet wide, thoroughly well and substantially built of pile bents spaced 10 feet apart. It has proved a great convenience to the steam ferry service recently established across the harbour.

The total expenditure incurred in connection with ferry landing at North Wallace may be shown in detail as follows:—

Dredging channel across harbour at about.....S	12,000 00
Construction of combined protection and landing pier and ferry slip.....	43,250 65

## NYANZA.

Nyanza, Victoria County, is a settlement between Middle and Baddeck Rivers on Indian Bay, a reach of an arm of the Bras d'Or Lake known as St. Patrick's

Channel. It is 7 miles from Baddeck, the shiretown, and 11 miles from Whycomagh.

In November 1893, a contract was made for the construction of a brush wharf to extend 136 feet into 12 feet at low or 13 feet at high lake level, and at the close of that year the contractor had procured the necessary materials and was about ready to commence construction.

During the fiscal year 1894-95 the work under contract was completed.

No important repairs have been made since 1895.

Total expenditure to 30th June 1900 is \$1,943.14.

#### OGILVIE.

Ogilvie's breakwater-pier, King's County, is situated on the south shore of the Bay of Fundy, fifty-five miles east of Digby Gut, and eleven miles north of Aylesford on the Dominion Atlantic Railway. Like other ports on the Bay of Fundy shore in King's County, its trade has greatly declined since the construction of the Dominion Atlantic Railway, being now restricted to occasional small shipments of cordwood, fish and potatoes.

The work here, which serves both as a wharf and breakwater, was built about the year 1854 at the joint expense of the inhabitants and the Provincial Government. It is 270 feet long, 38 feet wide on top and about 27 feet high at the outer end, built throughout of closed-faced, square-timber cribwork. In 1884-5-6 the department expended the sum of \$3,156.63 in strengthening the outer end by building an entirely new block 20 feet long, and by taking down and rebuilding the old break for a length of 100 feet. In 1890-91 the sum of \$125.00 was spent in a few general repairs. In 1891-92 the sum of \$500.00 was spent in repairing and strengthening the shoreward end 90 feet in length. The face was taken down and rebuilt, being tied into the old work with new cross-ties, and the new work well filled with ballast.

In 1897-98 the sum of \$1,537.39 was expended in building a re-enforcing block on the shore end of the east side 153 feet long, 10 feet wide and to the full height of the work to support the breakwater which was leaning over and threatening to fall.

In 1898-99 the sum of \$50 was expended in placing about a dozen new fenders to replace those broken and decayed, and a few other trifling repairs.

Total expenditure to 30th June 1900, including refund of \$470.00 paid to Provincial Government, \$5,839.02.

This work was transferred to control of Department of Marine and Fisheries on 12th June 1888.

#### OYSTER POND.

Oyster Pond, Guysboro' Co., is one of the several large ponds on the north shore of Chedabucto Bay which form the only boat harbours between Cape Argos, on the western side of the entrance to the Strait of Canso, and Guysboro Harbour, a distance of 15 miles.

In 1878, the entrance to the pond was improved by hand dredging, and protected by the construction of a breakwater on its eastern side, 180 feet in length.

During the year 1884-85, the breakwater was extended 105 feet over a level bottom, dry at low water. The width of the inner work is 14, and of the extension, 16 feet. In 1886-87 the breakwater was strengthened and repaired.

Up to the time of the completion of the outer portion of the breakwater on the eastern side of the entrance, in 1885, the beach on the western side was about 4 feet above high water, and formed a natural protection to the best anchorage

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in the Pond, subsequently the beach was gradually worn away down to about half tide level, and the sand and gravel of which it was composed was carried into the pond, decreasing the depth over the anchorage, from 12 to 6 feet, at low water.

To prevent further injury to the anchorage, and to confine the current to the channel, and thus increase its strength over the bar, a contract was entered into in February 1898, for the sum of \$1846, for the construction of a work, designed to restore the beach to its original condition. The work was commenced early in June 1898.

During the year 1898-99, the work under contract was completed and the sum of \$160.75 was expended in improving the entrance by hand dredging, and by the removal of several boulders.

The beach protection work is 400 feet in length, 12 feet in width over 360 feet from the inner end, and 16 feet in width over the outer 40 feet, and 8 feet in height, the top being 4 feet, above extreme high water. It is of round timber cribwork fully ballasted, covered with flatted timber, and close-fendered at the outer end, and on the seaward side for a distance of 47 feet from the outer end.

During the last fiscal year, the sum of \$149.75 was expended in completing improvements to the entrance undertaken in 1898-99.

The depth at extreme low water, over the bar, obstructing the entrance to the pond is about 2 feet. Spring tides rise 6 feet.

Total expenditure to 30 June 1900 is \$7,109.47.

## PARKER'S COVE.

Parker's Cove, Annapolis County is situated on the southern shore of the Bay of Fundy, about 15 miles to the eastward of Digby Gut, and is directly north of Annapolis, its nearest railway station, and distant therefrom 7 miles.

During the year 1883-4 a small breakwater, 165 feet in length and 26 feet wide, was built near the eastern end of the cove for the accommodation of small boats and fishermen. The breakwater extends outwards at right angles to the head of the cove 100 feet, and its outer end has a slight angle to the westward.

Spring tides rise at this place about 30 feet, but as there is only 8 feet of water at the end of this pier at high water it is of little use for shipping purposes, and is therefore only used by fishermen.

During the year 1889 the sum of \$200 was expended in general repairs to the structure. These consist of ten new fenders for the inner face, renewing 80 feet of cap timber, raising the surface of the outer end 2 feet and protecting the foundation from further settlement. The work is now in good order.

Total expenditure to 30th June, 1900 is \$4,499.41.

## PARRSBORO (PARTRIDGE ISLAND)

Partridge Island or Parrsboro' Pier, Cumberland County, is situated on the north side of the Basin of Minas, about a mile to the westward of the mouth of the Partridge Island River and about 2 miles distant from the town of Parrsboro, the terminus of the Cumberland Railway and Coal Company's Railway.

The pier which is 500 feet in length, being directly on the seashore, has the benefit of the full extent of the tides, and as vessels can approach it and leave it at half-tide, it is the principal point of communication between Cumberland Co. and the counties of King's and Hants, on the south shore of the basin, and the steamers of the Basin of Minas, and St. John and Basin of Minas routes call there regularly during the season.

In 1895 the outer 110 feet was raised to the level of the shoreward portion, the maximum height is 8 feet and width on top 26 $\frac{3}{4}$  feet.

During the year 1896 the sum of \$1,447.28 was expended in cutting an opening

12 ft. wide and 10 ft. deep through the pier near its shoreward end for the purpose of allowing the gravel to wash through and relieve the great pressure against the west side of the work, in reflooring 80 ft. in length of the shore end, reflooring the inclined slip, and in renewing a few of the new fenders on the outer end.

Petty repairs were made in 1897.

Total expenditure to 30th June, 1900, including refund of \$1,674.80, paid Provincial Government, \$6,955.52.

This pier was transferred to control of Department of Marine & Fisheries on 12th June, 1888.

#### PETIT DE GRAT.

Petit de Grat Inlet, Richmond County, lies between Petit de Grat Island and the eastern extremity of Isle Madame. The main entrance (for vessels) is at the south end, from the Atlantic. The northern entrance, from Rocky Bay, is obstructed by outer and inner shingle bars, through which passages for boats, at ordinary low water, were opened in 1879-82.

In 1898-99, the inner chanuel was deepened to 1 foot 4 inches at extreme low water, over a width of 20 feet, except where ledge rock was met near the outer end, where it has a width of 15 feet; the outer channel was deepened to from 1 foot 4 inches to 1 foot 8 inches at extreme low water, over a width of 25 feet: and a protection work of round timber and stone, 8 feet in width and 3 ft. 6 inches in height from 1 foot 6 inches below extreme low water, (with the exception of the outer 21 ft. which is 17 feet in width and 2 feet 6 inches above extreme high water), was constructed on the west side of the outer channel over a distance of 210 feet: or to within 85 feet of the inner end.

The expenditure up to 1882 amounted to \$3,250, and in 1898-99 to \$1,046.41, making a total expenditure to the end of the fiscal year 1898-99 of \$3,296.41.

During the fiscal year 1899-1900, the sum of \$453.59 was expended in improving the outer channel, and in continuing the protection work on its western side. The protection work was extended inwards, 85 feet with a return of 21 ft. at the inner end, and increased in height 10 inches by the addition of longitudinal timbers along the channel face bolted, directly, to the upper face-timbers, without cross-ties.

#### PETITE RIVIÈRE.

Petite Rivière, Lunenburg County, empties into Green Bay, about 7 miles to the westward of the mouth of La Have River. The mouth of the bay is some 2 miles wide, and is directly exposed to storms from the Atlantic.

During the year 1886 the construction of a breakwater, built entirely of stone, was commenced at Cherry Point, a short distance to the south of the river, and with the amount available, 200 feet have been built, 20 feet wide on top and standing 5 feet above high water springs.

In 1887 the outer end of the breakwater, which had settled, was raised 18 inches. Additional large stones were placed on the outer slope and end.

No important repairs were made since 1887.

Total expenditure to 30th June 1900 is \$5,813.37.

#### PICKETTS PIER (CANNING)

The Picket Wharf, so called, in King's County, is situated on the south side of the mouth of the Habitant River, two miles below the village of Canning, and about the same distance from the village of Lower Canard. It is conveniently placed with regard to a large and thickly populated area of the richest fruit growing and agricultural land in Nova Scotia.

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The wharf was begun in 1845, and extended in 1859-60 by the inhabitants, aided by the Provincial Government. Since these dates the department has expended upon it, in renewals and general repairs, in 1878, \$500; in 1885, \$100, and in 1886, \$500.

It is 190 feet long, 60 feet wide, and at the outer end, which is now about two feet below high water ordinary spring tides, it is 23 feet high. Spring tides rise 48 feet, neaps 40 feet.

During the year 1896-97, the sum of \$498.88 was expended on some very necessary repairs. The work done consists of the rebuilding of the crib breast-work along the outer face of the shoreward end for a length of 170 feet, that had fallen into decay and threatened to make an island of the main portion of the wharf. Portions of the top of the wharf were also filled up with stone and gravel so that teams could come alongside vessels loading potatoes and other produce. This wharf is now in better condition than it has been for some years, though it is still, as a whole, in a very advanced stage of dilapidation.

Total expenditure to 30th June 1900, including refund of \$55.00 paid to Provincial Government, \$2,353.69

This wharf was transferred to control of Department of Marine and Fisheries on 21st April 1884.

## PICTOU ISLAND

Pictou Island, in the Strait of Northumberland, and about 10 miles north-east of the entrance to Pictou Harbour, is 5 miles long and  $1\frac{1}{2}$  miles in width.

There are two wharfs on the south side of the island; one near the west end, and one known as the 'east wharf,' near the centre.

The west wharf was commenced by the Provincial Government. It was repaired and strengthened by the department in 1880; extended 62 feet 6 inches in 1887-8, 50 feet in 1891-3 and 82 feet in 1892-4, and repaired in 1894-5.

The east wharf was commenced by the department in 1882-3 and has since been repaired and extended; the extensions including 100 feet built in 1887-8; 68 feet in 1891-3; and 60 feet in 1892-4.

The expenditure up to the end of the fiscal year 1897-8 in constructing, extending and repairing the two wharfs amounted to \$11,560.18, which may be subdivided into \$10,692.51 for construction and improvements and \$867.67 for repairs.

During the fiscal year 1898-9, \$766.85 was expended in repairing and strengthening the west wharf, and \$119.19 in repairing the east wharf.

The expenditure on the west wharf was made in levelling up and repairing the outer 82 foot block, the top of which had been damaged and forced out of place by ice; and in constructing a cribwork 20 x 20 feet on the east side near the outer end. The expenditure on the east wharf was made in raising, repairing and ballasting a portion of the east face of the second block from the outer end.

The depths, at extreme low water, at the outer ends of the east and west wharfs are respectively 4 feet 6 inches and 4 feet 9 inches: spring tides rise 6 feet.

Total expenditure to 30th June 1900, including refund of \$400.00 to Provincial Government, \$11,560.18.

These wharfs were transferred to control of Department of Marine & Fisheries on 12th June 1888.

## PICTOU LIGHT BEACH.

The beach forming the southern side of the entrance to Pictou Harbour, known as "Pictou Light Beach," extends about one mile in a northerly direction, enclosing Moodie Cove, an inlet nearly dry at low water except in a central channel. The outer end, on which stands a light-house and keepers dwelling, is

protected by a breast work of squared timber 450 feet in length, and by a work of brush and stone extending from side to side opposite the southern extremity of the breast work, and inclosing property under the control of the Department of Marine and Fisheries.

In 1894-95, the sum of \$300, was expended in acquiring a title to a portion of the beach, 1,520 feet in length, adjoining the property of the Department of Marine and Fisheries.

The sum of \$2,800, was appropriated for expenditure during 1898-99, in the construction of works to protect the beach, which was swept by the sea during the great gale of August 1873, and had been more or less damaged by succeeding storms.

During the fiscal years 1898-99 and 1899-1900 works to protect the beach were constructed. The works included : brush and stone, 12 feet wide on top and 4 feet in height, founded at 1 foot above extreme high water and extending 1,030 feet from the southern end of a breast work protecting the extremity of the beach, on which the light house stands; and two groins, respectively 65 and 55 feet in length, 5 feet in width and 5 feet in height with inner ends 5 and outer ends 2 feet above highwater, made by driving piles in pairs 5 feet apart, filling in with brush, secured by cross caps, and with close-piling at the outer ends. One of these is opposite the southern end of the breast work, and the other opposite the brush and stone work 200 feet to the southward of the first groin.

The protection works in September were in good condition with the exception of a slight settlement of the brush in the groins, and that they formed an efficient protection to the beach south of the breast work : but that a portion of the breast work, to the northward of its southern extremity, was in danger of undermining. The two groins were filled in with brush to the under side of the caps, and a groin 75 feet in length opposite the breast work, 200 feet from its southern extremity was constructed. This will involve the expenditure of part only of the amount authorized : the balance need not be expended at present.

The materials required were procured for the 75 feet groin, and in completing the groin with the exception of the outer 15 feet, 10 feet of which is to be close-piled.

#### PLYMTON.

Plymton is situated on the south shore of St. Mary's Bay in Digby County. In 1874 and 1875 the sum of \$3,543.97 was expended in the construction of a block 34 feet square at the outer end of the pier, built some years before Confederation by the Provincial Government, and in general repairs to that structure.

No important repairs have been made since 1875.

Total expenditure to 30th June, 1900, including refund of \$100.00 paid to Provincial Government, \$3,643.97.

This block was transferred to control of Department of Marine & Fisheries on 12th June, 1888.

#### PORT GEORGE.

Port George, Annapolis County, is a thrifty village of some four hundred people engaged in fishing and farming, situated on the south shore of the Bay of Fundy, 37 miles north-east from Digby Gut and 42 miles south-west from Scott's Bay. It is six miles south-west from Margaretville, and five miles north-west from Middleton, an important station and junction on the D.A.Ry. Some years prior to Confederation a small harbour dry at low water, (spring tides rising about 30 feet) was formed by the Provincial Government, by the construction of a western breakwater and an eastern pier or wharf. The breakwater is 440 feet long, 25 to 35 feet wide, on top, and at the outer end where there is about 21 ft.



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of water at H.W. it is 25 feet high. It is built of round log, stone filled, crib-work, and the eastern or seaward face, besides being well fendered and close sheated, is provided with a solid timber break 7 feet high, strongly kneed. The wharf on the east side is 205 feet long, 20 wide and 18 feet high at the outer end. It is built of round log cribwork and the outer block on which stands a small lighthouse is close sheated. In 1874 the harbour was taken in charge by the Public Works Department and in that and the following year the sum of \$7,000 was expended in repairing and refacing the breakwater, which was much decayed. In the autumn of 1888 the outer end of the breakwater was destroyed by a severe storm, 165 feet in length being wrecked, and an additional length of 30 ft. being much injured. Before repairs could be made a second storm destroyed the damaged portion, leaving 195 feet of the work a complete wreck and rendering the harbour practically useless. In 1890-91 the sum of \$5,137.16 was expended in rebuilding the destroyed portion of the work by contract. The work is built of round timber, and all the cribs filled solid with stone ballast. The seaward face has a double set of face timbers and is sheated outside them with 7 inch sheathing. The work is 33 feet wide on top, and there is a break of square timber 7 feet high, heavily bolted and braced with frequent knees, extending the entire length of the seaward side. In 1892-93 the sum of \$286.71 was expended in general repairs to the breakwater, and \$299.94 in removing gravel from the dock on the eastern side. In April 1894 an exceptionally severe north-east gale caused a serious breach in the breakwater, at about midway in its length, or immediately shorewards from the new outer block. The breach was 40 feet long, the full width of the work, and about 17 feet high. In the autumn of the same year the sum of \$1,398.16 was expended in rebuilding this gap with solid new work. In 1896-97 the sum of \$398.50 was expended in refilling with stone and timber a dangerous hole nearly 100 feet long and from 3 to 12 feet wide in the lower side of the seaward face of the breakwater and in close sheathing a length of 46 feet on the shoreward side together with the renewal of a few floor planks. In the fiscal year ending June 30th, 1900, the sum of \$399.98 was expended in re-sheathing about 40 ft. in length of the seaward side of the shore end of the breakwater, and in renewing a number of fenders, braces, stringers and flooring.

Total expenditure to 30th June, 1900, including refund of \$1,076.75 to Provincial Government, \$23,703.96.

This work was transferred to control of Department of Marine & Fisheries on 12th June, 1888.

## PORT GREVILLE

Port Greville, Cumberland County, is situated in Greville Bay, on the northern side of the Minas Channel, Bay of Fundy, and at the mouth of the Ratchford River. It is about 15 miles west of the town of Parrsboro', the terminus of the C. R. & C. Company's Railway, and 15 miles east of Cape d'Or.

The harbour is formed by a high gravel bar, which lies parallel to the shore, between which the river runs for half a mile before reaching low water mark. The bar although high, was, previous to 1872, covered during high water springs; but during that year a gale occurring at that stage of the tide, the sea swept off the crown of the bar for a length of 2,800 feet, and to a depth of about  $2\frac{1}{2}$  feet. The protection thus afforded by the bar was in a great measure destroyed, and to restore its usefulness and improve it a wall of round timber cribwork, 2,200 feet in length and averaging 7 feet in depth, was constructed by the Department in 1874.

During 1886-87 a breakwater was constructed off the eastern end of the crib-work wall, for the double purpose of arresting the gravel which was being swept into the harbor by westerly gales, and deviating the course of the river, so as to shorten its passage to the sea. It is 250 feet in length and 21 feet wide on the top, with sides sloping  $\frac{1}{2}$  to 1 on the seaward face. The work averaged a

depth of 20 feet; it is built of round timber cribwork, the seaward face being sheathed with 6-inch plank, and the inner face and end being close-piled to a depth of 3 feet below the line of assumed clay bottom, to prevent scouring of the foundation. Low water mark extends out about 250 feet from the end of the breakwater. Spring tides rise 40 feet, neaps 33 feet.

Total expenditure to 30th June 1900, including refund of \$938.00 paid to Provincial Government, \$16,255.17.

This work was transferred to control of Department of Marine & Fisheries on 12th June 1888.

#### PORT HILLFORD.

Port Hillford, Guysboro Co., is situated at the head of Indian Bay on the southern or Atlantic coast of Nova Scotia, and distant about 10 miles to the south-eastward from Sherbrooke.

A contract was entered into on September 15th 1899 for the construction of a breakwater at "Breakwater Point," on the east side of, and near the head of the Bay, for the sum of \$6,763.00.

The contract is for a work 300 feet in length and 22 feet in width, on top, with an L, 22 x 22 feet, of openfaced crib-work protected on the seaward side and at the outer end, by hardwood sheathing. The depth, at extreme low water at the outer end will be 9 feet. Spring tides rise 6 feet.

During the winter the necessary materials were procured, and delivered early in the spring. Construction was commenced on May 18th, and carried on in a vigorous manner, and, at the close of the fiscal year the sub-structure of the inner 200 feet had been placed and built upon, to an average height of 5 feet below the level of the intended top.

Total expenditure to 30th June 1900 is \$2,241.19.

#### PORT HOOD.

Port Hood, the shiretown of the county of Inverness, is on the west coast of Cape Breton Island, 20 miles north of the northern entrance to the Strait of Canso.

The harbour was formerly a secure one. Smith's Island, which is 2 miles in length and forms its western side, having been connected with the mainland by a range of sand hills.

In 1839 the sea made a breach through this protection. The opening at first narrow, was enlarged by the tidal currents with increasing rapidity, until it was entirely swept away and its site occupied by 15 feet of water. The harbour is now unsafe during northerly gales, except in a small cove on the east side of Smith's Island.

The pier, which is on the eastern side of the harbour, was commenced by the Provincial Government in 1865-66. It was originally 550 feet in length and 24 feet in width, with an L at the outer end 100 feet in length and 25 feet in width. It came under the charge of the Federal Government in 1871, since which time extensive repairs and renewals have been made, including the construction of a new block 125 feet by 25 feet at the outer end, in 1873; the construction of a block 50 x 32 feet at the south end of the L, in 1888-89, the construction of a block 71 feet by 24 feet at the outer end in 1889-90; and in extensive repairs to the outer portion including close-piling 223 feet of face; reballasting empty face chambers, and in placing 3,000 superficial feet of 4 inch covering in 1897-98 and 1898-99.

During the fiscal year 1899-1900 the sum of \$699.99 was expended in continuing repairs to the outer portion of the pier, in progress in 1897-98 and 1898-99. Of the above amount, \$300.00 was expended in close-piling 30 feet of face, and

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in placing 2,507 superficial feet of 4 inch covering ; and the balance in effecting repairs to the seaward face, near the outer end, and in blocking up floor-stringers and patching old covering.

Total expenditure to 30th June 1900, including refund of \$916.11 to Provincial Government is \$57,515.47.

This work was transferred to control of Department of Marine and Fisheries on 12th June 1888.

## PORT LORNE (PORT WILLIAMS).

Port Lorne is a settlement of about 300 people, situated on the Bay of Fundy coast, Annapolis county, 32 miles from Digby Gut and 6 miles north-west from Paradise station on the Dominion Atlantic railway. A breakwater was begun in 1835 at the joint expense of the inhabitants and the Provincial Government. In 1873 and 1874 the department spent \$3,500 in extending it ; in 1879-80 the sum of \$745.76 in repairs ; in 1882-83 the work was again extended at a cost of nearly \$5,000, and it has since been several times repaired. The breakwater-pier proper has now a total length of about 310 feet and is 36 feet wide and 25 feet high at the outer end. In order to divert the brook, which during freshets tore away the loading berths for vessels on the eastern side of the pier and threatened to undermine and destroy the breakwater proper, a training pier of cribwork 110 feet long by 10½ feet wide and about 16 feet high, has been built about 150 feet to the eastward. During the year 1898 the sum of \$2,999.87 was expended in constructing a re-enforcing block, on the seaward side of the outer end of the breakwater, 178 feet long, 27 feet high and 13 feet wide. The top of the outer block was also rebuilt, levelled up and connected at the same level with the new block. The rest of the seaward face to the end of the work as well as the end of the work itself, was close sheathed. The end break, 4 feet high, was renewed, and new cap timbers and mooring posts provided. The shoreward half of the structure was refloored and other miscellaneous repairs were done. This breakwater is now in first-rate condition.

Total expenditure to 30th June 1900, including refund of \$1,589.33 paid to Provincial Government \$1,695.63.

This work was transferred to control on Department of Marine and Fisheries on 12th June 1888.

## PORT MAITLAND.

Port Maitland, Yarmouth County, is a prosperous and important fishing and farming village, with a population of about 400, situated on the south-east side of the mouth of the Bay of Fundy, 12 miles north of the county town of Yarmouth. Spring tides rise 18 feet and neaps 13 feet.

The harbour works were begun about the year 1859, by the Provincial Government ; they consist of an eastern and western, or main, breakwater of crib-work. The former is 400 feet long and some 20 feet wide, and the latter is 500 feet long, 22 to 25 feet wide, and has a return 54 feet long, 24 feet wide and 27 feet high, along which there is a depth of 19 feet at H.W.O.S.T. These breakwaters or piers enclose between them a snug highwater harbour of 2¼ acres in extent.

In 1873-74 the eastern breakwater was raised and widened for a length of 158 feet on the shore end and extending 50 feet in length was built on the outer end of the western breakwater at a cost of \$2,000. In 1885-86 the sum of \$349.92 was expended in raising the outer end of the eastern breakwater, and in repairing and partly renewing the sheathing of the outer face of the western breakwater. During the early part of the winter of 1887-8 the western breakwater was seriously damaged by a succession of storms, and a breach 86 feet in length was made directly through the middle of the work. This year the sum of \$53.65 was spent in urgent repairs and in the following year, 1888-9, the wreckage was cleared

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away, both sides of the breach closed up, and a number of fender piles were driven along the outer face and exposed corners of the broken work, at a cost of \$497.33.

On the 24th June, 1890, a contract was made for re-building the destroyed section and repairing the other parts of the work. The wreckage of the old work was removed down to its foundations, and the breach filled in and rebuilt entirely with new and substantial work. The rest of the seaward face, i. e., 83 feet in length outside the new work, and 100 feet between it and the shore, was close piled: the entire top, including the cap, covering, floor stringers, the first set of cross ties and the break of those two sections, was rebuilt, and new fenders were fitted to the inside face. In 1891-92 the sum of \$298.45 was expended in repairing the eastern breakwater, the work consisting of the removal and rebuilding of almost the entire top to a depth of 3 feet.

In 1895-96 \$271.71 was spent in purchasing materials for repairs, the work done consisting of rebuilding the shore end of the north side of the western breakwater 90 feet long, 10 to 12 feet wide and 15 feet high; the labour was furnished *gratis* by the inhabitants. In 1896-7 the sum of \$3,304.79 was expended on extensive repairs and renewals to both works. On the eastern breakwater which also serves as a wharf for the landing and loading of general merchandise, coal, lumber, &c., the shoreward 30 feet was rebuilt on the south side 6 logs high, and on the north side 3 logs, including floor stringers and covering: 22 feet in length of new covering was laid on the outer end, and a number of new fenders were bolted into position.

On the western breakwater a re-enforcing block was built on the south side of the outer end 97 feet long, 11 feet wide, and 12 to 14 feet high, or to a height of about 10 feet below the floor of the work: a re-enforcing block was also begun along the whole length of the ell 70 feet in length and from 10 to 12 feet wide. To obviate settlement due to soft bottom and the eating away of the bottom logs by the limnoria, which was the cause leading to the necessity of constructing this block, it was built on 147 piles driven to hard bottom, and cut off level with the beach. The inner or north side of the shoreward end was also strengthened and rebuilt.

In 1897-98 the sum of \$3,600 was expended in further repairs and renewals to both breakwaters, the re-enforcing block along the ell of the western breakwater was completed to the full height of the work, and the inner face of the other end was renewed. The buttress on the outer side was extended shorewards a length of 122 feet. On the end of the eastern breakwater the T was rebuilt 50 feet long, 20 feet wide, and built on 21 piles driven to hard bottom, and cut off level with the beach. Various miscellaneous and necessary repairs were also effected.

In 1898-99 the sum of \$700.00 was expended in completing the thorough and extensive repairs to the western breakwater: 60 feet on the inner face was close sheated, the buttress on the seaward side, 140 feet long, was finished, and several vacant spaces in the shoreward end were filled with ballast.

In 1899-1900, the sum of \$2,118.87, under the appropriation of \$2,300, was expended in rebuilding the re-enforcing buttress on the outer end seaward face of the breakwater, 96 feet long, 10 to 12 feet wide, to the full height of the work. The lower 12 feet of this length, and the outer end of the work, were also sheated with 4 inch creosoted plank as a protection against the limnoria.

Total expenditure to 30th June, 1900 is \$11,052.25.

This work was transferred to control of Department of Marine & Fisheries on 22nd January, 1885.

#### PUBNICO HEAD.

Pubnico Head is situated in the extreme south of Yarmouth county, about 20 miles south-east from the county town. It is 8 miles long, north and south, by three-quarters of a mile to one and one half miles wide. At the extreme head is a settlement of some five or six hundred people engaged in farming, lumbering

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and fishing. The Coast Railway has a station here, 31 miles from Varnmouth. Some ten or twelve years ago a little wharf was built by the inhabitants, aided presumably by the Provincial Government. It was 57 feet long, 28 feet wide and at the outer end, 12½ feet high, consisting of a stone bank approach 15 feet long, a span of 21 feet and a roughly built block of round log cribwork 21 feet long.

In order to increase the accommodation of the wharf and to lengthen the time at which schooners can approach and lie at it, the department during the year 1898, expended the sum of \$895.00 in thoroughly repairing the old structure and building an additional block and span at its outer end. The new block is 28 feet wide across the wharf, 18 feet long in length of wharf, and 15 feet high, giving about 11 feet of water at the outer end at high water of ordinary spring tides. The span connecting the new block with the old work is 9 feet long. At low water there are only two or three feet in depth at the outer end. The new work has been well and substantially built and is of great benefit to the locality.

Total expenditure to 30th June 1900 is \$895.00.

## PUDDING PAN

The Pudding Pan is a small island lying about half a mile off the coast, nearly midway between Coffin's Island and Medway Head. At low water it is almost connected with the mainland by rocky reefs and bars. To complete this connection a detached breakwater, 875 feet in length, has been constructed on the shoals east of the island. This has the effect of sheltering the cove west of the island from south-easterly gales, and forms a small harbour of refuge, which, however, is still open to the Atlantic on the south-west.

The work was done in 1879 at a cost of \$5,714.75.

No important repairs were made on this work since 1879.

Total expenditure to 30th June 1900 is \$5,714.75.

## PUGWASH.

Pugwash, Cumberland county, is a town of nearly 2,000 people, situated on the south side of the Straits of Northumberland, 50 miles west of Pictou, 10 miles west of Wallace, and 20 miles east of Baie Verte. It is the terminus of the Pugwash branch of the Oxford and New Glasgow division of the Intercolonial railway. From ten to fifteen millions feet of deals are annually shipped to Europe. Up to 1896 the only wharf from which lumber could be shipped was the railway wharf, but as this had a frontage of only 60 feet, not more than one vessel could load at a time, and there were often several awaiting their turn.

To facilitate this important export trade, the department, in May, 1897, let a contract for \$8,640.00 for the construction of an additional wharf. Work was begun in June 1897, and finished in December of the same year. The wharf is a substantially built structure of stone filled cribwork, 145 feet long, 50 feet wide and with 16 feet of water at its outer end at low water spring tides. From midway between high and low water to the bottom of the work it is constructed of creosoted timber on account of the prevalence and destructiveness of the "limnoria." The wharf is so located as to be reached by a spur track of the Intercolonial railway and it has already proved of great advantage to the locality.

Total expenditure to 30th June 1900 is \$9,143.33.

## RAGGED HEAD

Ragged Pond, Guysboro' Co., on the north side of Chedabucto Bay, about 6 miles east of Guysboro' Harbour, is a triangular sheet of water with an area of about 180 acres and a depth of from two to five fathoms. It is enclosed by

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shingle beaches, through which there is a narrow channel on the western side of Ragged Head.

During the years 1878-83 the sum of \$4,744.61 was expended in improving the channel through the beach, and in constructing 110 feet of cribwork and 428 feet of brush and stone works on the southern side.

During the fiscal year 1899-1900, the sum of \$200 was expended in renewing the covering, stringers and upper ties of the inner 50 feet of the cribwork : and in removing a deposit of gravel obstructing the channel.

The surface of the pond is 3 feet higher, (at low water inside) than low water outside ; consequently there is a fall at low water, of 3 feet in the length of the channel (600 feet). The depth in the channel, at low water, is about 3 feet, except near the entrance where it is about 1 foot. Spring tides rise 6 feet.

#### RIVER HEBERT.

River Hébert is a tidal stream in Cumberland county, flowing north into Chignecto Channel at the head of Cumberland Basin. At high water it is navigable during the summer season from Minudie, at its mouth, to the village of River Hébert, a distance of six miles, over the whole of which distance is a depth of 17 feet at H. W. O. S. T. (Spring tide rises 46 feet, neaps 38 feet).

The village of River Hébert, situated on and near the stream, is a scattered but prosperous farming and lumbering settlement, having within a radius of a mile a population of some four or five hundred people. It is the only intermediate station on the Joggins Railway running between Maccan station on the I. C. Railway and the Joggins Mines being eight miles from the former and three from the latter.

At the head of tide water, some three or four miles above the village, are two large saw mills, and in the neighbourhood several smaller ones, of which the total output has averaged nearly ten million feet of lumber yearly since about 1890, the whole of which is brought down the river on scows and landed onto schooners lying in the river at the village.

Within half a mile of the village is a small coal mine with an output (when working) of 50 tons per day, which, owing to the lack of shipping facilities is exported by rail. For want of a wharf also, the five local stores, and the saw mills in the neighbourhood, import most of their general merchandise and supplies by rail, though some heavier freight, such as flour, molasses, &c., come by schooner, and is landed by means of temporary gangways laid from the schooner's deck to the top of the steep mud bank of the river, at considerable risk and inconvenience.

On February 20, 1899, the Public Works Department entered into a contract with Mr. John W. Tingley, of Nappan, to construct a public wharf on the west bank of River Hébert, that will have 16 feet depth along its outer surface at high water ordinary spring tides, for the sum of \$1,195 00.

The wharf, let by contract, measures 82 feet in length and 55 feet in width and its top is 4 feet above H. W. O. S. T. ; it consists of pile trestle bents thoroughly bolted and braced and connected by good substantial walings, and its end and eastern side is protected by close faced piling.

Total expenditures to 30th June 1900 is \$962.80.

#### RIVER JOHN.

River John, Pictou Co., empties into the head of John Bay, on the Northumberland Strait, about 24 miles to the westward of the entrance to Pictou Harbour. It has about 3 feet at low water or 11 feet at high water over the Bar at the entrance, and from 3 to 11 feet at low water in a very narrow channel up to the bridge, a distance of nearly a mile. The village is situated on each side

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of the river near the bridge, and about  $\frac{3}{4}$  of a mile from the station on the Oxford and Pictou branch of the Intercolonial Railway.

The sum of \$2,000, was appropriated for expenditure in 1899-1900 in connection with the construction of a wharf at River John.

During the year the land required as a site for the proposed wharf was purchased, and the creosoted timber to be used in its construction was treated but not delivered.

Total expenditure to 30th June 1900 is \$449.94.

## SALMON RIVER.

A small stream called Salmon River, Digby County, empties into the Bay of Fundy 15 miles north of Yarmouth, 30 miles south of Weymouth,  $3\frac{1}{2}$  miles north of the boundary line between the counties of Digby and Yarmouth, and  $4\frac{1}{4}$  miles north of Port Maitland in the latter county.

The population of the settlement, within a mile either way of the river's mouth, comprises about five hundred people engaged in farming, lumbering, fishing and general trade. The imports by water are general merchandise for local consumption, and the exports, lumber and cordwood with smaller quantities of farm produce and fish. The river, though not large, drains a number of lakes, and is the most important stream in the southern part of Digby County. It empties into the Bay of Fundy through a sand and gravel bar, inside of which there is a sheltered pond, which, with the exception of the bed of the stream, is dry at low water. (Spring tides rise about 18 feet, neaps 15 feet). The pond has been formed into a small tidal harbour by the construction of two separate works, one on either side of the river's mouth.

The southern work, which is the more important, stops the gravel from interfering with the free discharge of the river and at the same time acts as a breakwater and loading wharf for vessels.

The northern work is simply a groyne or gravel pier, built to prevent the under tow from bringing the gravel into the river mouth from the north beach, and by somewhat confining the outflow, to give a better chance to scour.

Both these works, with the exception of certain repairs hereafter described, were built by the Provincial Government and private enterprise.

The first expenditure by the Department was in 1874, when the sum of \$2,656.03 was spent in repairing and strengthening the works. In 1887-88 the sum of \$1,500 was expended in rebuilding portion of the river face of the southern work, which was much decayed and also undermined by the river. These repairs were begun at the western end of the private wharf property, then owned by Foley Bros. (more recently by Charles Burril & Co., of Weymouth, and purchased from him by the department in 1899-1900) and continued westerly towards the outer end of the breakwater for a distance of  $290\frac{1}{2}$  feet, but the outer end of this face for a distance of 120 feet, was left in its original condition. In 1893-94 the sum of \$800 was expended in general repairs to both works, the work being done as follows:

Wharf or breakwater.—A block on the south face 32 feet long and 20 feet wide was cut down and rebuilt; the outer end for 30 feet was raised about 18 inches; and 26 new fender piles were placed, 6 on the end and 20 along the outer face.

Gravel pier or groyne:—The inner 90 feet was practically rebuilt; the adjoining 30 feet was covered with new cross-ties and floor stringers; and a 20 foot block was rebuilt on the outer end to replace the 30 feet block that had been carried away. In the fiscal year 1899-1900 the sum of \$400, was expended in purchasing logs and timber for the purpose of building a further extension to the breakwater, and in repairing the existing work on the north side of the river's mouth.

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Total expenditure to 30th June 1900, including refund of \$329.92 to Provincial Government, \$7,684.90.

This work was transferred to control of Department of Marine and Fisheries on 12th June 1888.

#### SANDFORD (CRANBERRY HEAD)

Sandford (Cranberry Head) is situated on the Atlantic coast of Nova Scotia at the extreme western point of Yarmouth County, 7 miles north-west from the town of Yarmouth. The settlement in the neighbourhood, which has for some few years been known as Sandford, has a population of from 300 to 400 people, engaged in fishing and farming; in 1858 a breakwater was begun by the inhabitants aided by the Provincial Government. In 1876, the sum of \$2,000.00 was expended by the Department in extending the work 150 feet; in 1878-79 the sum of \$1,000.08 was spent in constructing an additional length of 50 feet, and in repairing the older portions. In 1880 the sum of \$499.95 was expended in repairing the damage done by a storm in August, 1879. In 1883-84, \$100.00 was expended on re-sheathing the outer end, and in effecting other needed repairs. In 1885-86 some slight repairs were made to the seaward face of the breakwater at a cost of \$109. In 1887-88 miscellaneous repairs were made at a cost of \$768.74. In February, 1892, two serious breaches were made in the work, by heavy gales, and a large quantity of gravel was driven through them into the little boat harbour inside. If repairs had been made without delay, the work could probably have been saved, but nothing was done, and in the next two or three years about 300 feet in length, i. e. the whole work except the outer block, was destroyed, the remaining piece being 60 feet long, 22 feet wide and from 18 to 20 feet high. Before this date six or seven fishing schooners of 10 to 20 tons each, besides a number of smaller boats, were owned in the place, and a considerable fishing business was done. Since the destruction of the breakwater, owing to lack of shelter, the schooners and most of the boats were disposed of, and the fishing industry of the locality practically ceased to exist. In 1898-99 the sum of \$3,497.29 was expended in partially rebuilding the shoreward portion of the work on a new site rendered necessary by the altered configuration of the beach; the remaining outer block was also thoroughly repaired. The new work, of which a length of 200 feet was built during the year, starts at the shore at a point about 350 feet eastward of the point where the former work began, and it was built in a north-westerly direction towards the outer block of the old work, with which it was connected. Besides the portion of new breakwater built during the year, a small boat channel about 40 feet long and 8 feet deep, was excavated through the beach under lee of the breakwater to give access to the salt water pond which forms a very valuable shelter for the fishing boats during heavy gales in the winter season.

In 1899-1900 the sum of \$2,599.96 was expended in completing the rebuilding of the breakwater begun last year. The portion of the work built during the year being 81 feet long and 26 feet wide, with an average height of about 12 feet. A piece of beach protection work, 240 feet long, 10 feet wide and from 6 to 8 feet high was also built in a westerly direction from the shore end of the breakwater to prevent the seas from driving the gravel beach into the little pond which shelters the boats of the fishing fleet.

Total expenditure to 30th June 1900, including refund of \$11,632.00 to Provincial Government, \$27,902.31.

This work was transferred to control of Department of Marine & Fisheries on 12th June 1888.



## SAULNIERVILLE.

Saulnierville is a thrifty and extensive settlement on the south-east coast of St. Mary's Bay, Bay of Fundy, 36 miles south-west of Digby, 32 miles north of Yarmouth and 3 miles north of Meteghan River, the nearest public wharf and breakwater.

It has a population of about 350 people, engaged in farming, fishing, lumbering and general trade.

Some years before Confederation, a breakwater serving also as a loading wharf, was built by the inhabitants aided by the Provincial Government, at a cost of about \$2,000.

In 1876 the sum of \$4,000, of which half was contributed by the Department and half by the inhabitants, was expended in making thorough repairs to the work and in building an addition of 100 feet in length.

The breakwater has a total length of 468 feet, a width of 34 feet and at the outer end a height of 18 feet and a depth of water at H. W. S. T. of 13 feet.

Spring tides rise 21 feet, neaps 18 feet. At low water the sand flats are bare for several hundred feet beyond the end of the work.

This breakwater-wharf is built of cribwork of the usual type, and is at this date in fairly good condition, being in need of no repairs. It is only used in the summer season, being blockaded with ice during the winter.

Total amount expended to 30th June 1900, including \$1,859.59 refund to Provincial Government is \$5,863.72.

This pier was transferred to control of Department of Marine and Fisheries on 12th June 1888.

## SAW PIT.

Saw Pit Wharf, Lunenburg County, is a small structure of cribwork, 90 feet long, 14 feet wide and of an average height of 8 feet, with an inclined slip 32 feet long and 5 feet wide, situated on the south-east side of Lunenburg back harbour, about  $\frac{1}{2}$  of a mile from the town. It was built by the Provincial Government before Confederation for the use and convenience of the inhabitants of the numerous islands and headlands lying to the north and east of the Lunenburg Peninsula. In 1882-83 the Department expended the sum of \$146.04 in repairing it; the work done consisting of some new floor strikers, fenders, caps and planking and a small quantity of ballast. In 1899-1900, the wharf having reached such a state of dilapidation as to be practically useless, the Department expended the sum of \$900.00 in re-constructing the work. The new wharf, which is of pile work, has been built over, and on the site of, the old. It is 89 feet long, 20 feet wide with an additional length of 7 feet in an inclined slip, an approach of 60 feet long of earth and gravel, walled up with large stones on either side and filled and levelled up with gravel.

Total expenditure to 30th June 1900 is \$1046.04.

## SCOTT'S BAY.

Scott's Bay, Kings County, is situated in the Minas Channel, Bay of Fundy, not far from Cape Split. In 1879 a breakwater 350 feet in length was built on the western side of Jess Creek to form a harbour and shelter for vessels during south-westerly storms. The amount expended was \$3,000.00.

No important repairs have been made on this work since 1879.

Total expenditure to 30th June 1900 is \$3,000.00.

## SEASIDE.

Seaside is on the east coast of St. George's Bay, near the southern entrance to Port Hood Harbour; and about two miles west from Port Hood, the shire town of the County of Inverness.

During the fiscal year 1896-97 a contract entered into in 1895-96 for the construction of a wharf at this place was completed.

The wharf is 300 feet in length and 20 feet in width on top, of open-faced cribwork fully ballasted and close fendered at the outer end; the substructure is of creosoted North Carolina yellow pine and the superstructure of native timber. The depth at the outer end at extreme low water is 7 feet. Spring tides rise 4 feet.

Total expenditure to 30th June 1900 is \$6,938.61.

## NORTH RIVER (SEYMOUR POINT).

North River, Victoria county, empties into the north arm of St. Ann's Harbour, a fine basin 7 miles in length and about 2 miles in width, at the head of St. Ann's Bay, on the north eastern coast of the Island of Cape Breton.

A contract was entered into in September 1898 for the construction of a wharf at Seymour Point, on the western side of the entrance to the river, for the sum of \$2148.

The contract included the construction of a road approach 64 feet in length and 16 feet in width, a block and span work, 63 feet in length and 20 feet in width, and a pile extension 175 feet in length with a return of 20 feet at the outer end.

Construction was in progress at the end of the fiscal year 1898-99, and the work was satisfactorily completed on August 29th.

The bearing piles of the extension, with the exception of those in the six inner bents, are of creosoted timber.

The depth at the outer end of the wharf, at extreme low water, is 8 feet. Spring tides rise 6 feet.

Total expenditure to 30th June 1900 is \$2,363.55.

## SHEET HARBOUR.

Sheet Harbour is situated on the Atlantic coast of Nova Scotia, in the eastern part of Halifax County, and is distant about 60 miles to the eastward of the mouth of Halifax Harbour.

This harbour is one of the finest in Nova Scotia, being of considerable extent and having an abundant depth of water. It runs inland some  $6\frac{1}{2}$  miles to Jared's Point, where it divides into two arms, called respectively the West and East Rivers.

There are saw and pulp mills at the head of each arm, at which a very large amount of timber is cut, and a considerable amount of pulp is made. The lumber is exported in large vessels, principally barques, to the United Kingdom, and the pulp is shipped in schooners to the United States. Vessels coming to Sheet Harbour, generally arrive in ballast, and as all the available ballast grounds have been filled in, and the further depositing of it would injure the deep water channels, which are already narrow: during the year 1887-88, a ballast wharf was constructed by the Department at the head of the West River.

On the 9th January, 1889 a contract was entered into for the construction of a ballast wharf on the eastern side of the East River, starting from the end of the remains of Hall's wharf, running southerly a distance of 180 feet, and 20 feet wide, with an L 20 feet long and 20 ft. wide at the southern end, the work being

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built of round timber and the top, which is 3 feet above high water springs, is covered with 3 inch plank.

The work was completed during November 1890, and has proved of great benefit not only as a ballast wharf, but also as a public wharf.

At 10 feet from the face of the wharf, there are from 14 to 16 feet of water at low water springs, which depth will accommodate the largest vessels that frequent the harbour.

Spring tides rise 6 feet 6 inches; neaps rise 4 feet 6 inches.

Repairs amounting to \$150.00 were made in 1891 since which time no important repairs have been made.

Total expenditure to 30th June, 1900 is \$4,206.96.

This work was transferred to control of Department of Marine & Fisheries on 3rd September, 1889.

## SYDNEY QUARANTINE WHARF.

The quarantine station in Sydney Harbour is on the south arm near Keating's Point, and about three-quarters of a mile from Point Edward. The latter is at the extremity of the land lying between the south and west arms.

During the year 1892-93, the sum of \$1,200.02 was expended in building an addition to a small wharf near the southern boundary of the quarantine grounds. This wharf is a block and span structure 14 feet wide and 2 feet above high water, extending 100 feet to 7 feet 9 inches at extreme low water. The addition consists of a cribwork block 21 feet 6 inches on line of work by 39 feet 6 inches. The top of the covering is 4 feet above high water and the depth, at extreme low water, along the outer face, is 9 feet. Spring tides rise 5 feet.

Total expenditure to 30th June 1900 is \$1,200.02.

## SOUTH GUT.

South Gut, Victoria county, is the local name of the south arm at the head of St. Ann's Harbour. The latter is a fine basin 7 miles in length, the entrance to which is a few miles to the westward of the principal entrance to the great Bras d'Or Lake.

A wharf was commenced at this place in 1890-91, and completed in 1891-92, with the exception of the approach, the placing and bolting 12 fenders, and the cutting off the tops of fenders previously placed.

During the year 1892-93, the sum of \$199.91 was expended in completing the work.

The wharf is a block and span structure 198 feet in length. The depth at extreme low water at the outer end is 6 feet. Spring tides rise 6 feet.

Petty repairs were made in 1895 and 1897.

Total expenditure to 30th June 1900 is \$2,257.54.

## STONY ISLAND.

Stony Island, Shelburne County, is situated to the south-east of Bull's Head, Barrington Bay, about midway between Cape Sable and North-east Point.

During 1891-92, the construction of a breakwater 300 feet in length, 24 feet in width, with a depth of 14 feet at low water at its outer end, was commenced under contract. This was completed in August, 1892, and, it being found advisable to strengthen the pile portion of the structure, the necessary arrangements were made and the work done at an additional cost of \$150.

Petty repairs were made in 1897 amounting to \$45.69.

Total expenditure to 30th June 1900 is \$5,496.42.

## STANTON ISLAND.

Stanton Island, Yarmouth County, is situated 17 miles south-east from the town of Yarmouth.

During the fiscal year 1887 a wharf 100 feet in length and 25 feet in width was built, and has already proved of great benefit to the locality.

No important repairs were made on this wharf since 1887.

Total expenditure to 30th June 1900 is \$600.22.

## SUMMERVILLE.

Summerside is a village of some four or five hundred people, situated on the right or east bank of the Avon River about midway between Windsor, the county town at哈利, and the mouth of the river where it empties into the Basin of Minas. It is about four miles south of Cheverie. The prosperity of the place is almost due to ship-building, which up to a few years ago was carried on with great success, but since the decline of the industry the inhabitants have turned their attention to farming, to which the district is well adapted, though there is still a good deal of general ship-repairing done in the yards. The public wharf was built about the year 1866 by the inhabitants aided by the Provincial Government, its dimensions being 275 feet long, 29 feet wide and 20 feet high at the outer end. It is constructed of the ordinary round log cribwork, well fendered and filled with ballast. In 1888-89 the work having become almost useless because of renewal and repairs Messrs. E. Churchill & Sons of Hantsport, Nova Scotia and operate a small steamer making semi-weekly (now daily) trips between Avon River and Basin of Minas ports, repaired the outer end and built an extension, about 30 feet long and 25 feet wide, having on the eastern side an inclined landing for the use of the steamer when lying alongside at low water. In 1890 the Department expended the sum of \$3,414.52 in removing and rebuilding the (decayed) top of the work to a height of 6 feet, besides placing new fenders along the whole length and making general and much needed repairs. The work is now 24 feet high at the outer end with 21 feet of water at H. W. O. S. T. Spring tides rise 18 feet neaps 10 feet. In 1897-98 the sum of \$100 was spent on a few urgent repairs to the floor. In 1899-1900 the sum of \$200 was expended in removing the whole floor with guards, planking and stringers besides the making two sections of a number of new fenders.

Total expenditure to 30th June 1900 is \$7,911.51.

## TATAMAGOUCHE.

The village of Tatamagouche, with a population of about 1200, is situated on the western side of the river of the same name, about 1½ miles from its entrance into Tatamagouche Bay on the south side of the Strait of Northumberland. It is an important station on the Oxford & Pictou branch of the I. C. R. and has a railway between Oxford Junction on the main line and Pictou. The surrounding country, being well adapted for agriculture, is thickly settled and the surplus farm produce is shipped by small sailing vessels. The export of lumber and bark also forms an important item in the business of the place. At the village there are two small wharfs where all the business of the locality was formerly done, the inhabitants of the opposite or east side of the river being obliged to haul their produce round to the village by the bridge at the head of the harbour, a distance of three miles. To do away with this inconvenience and to promote the trade of the district the Department in 1888 built a public wharf on the eastern side of the river at a point nearly opposite the mouth of the French River, where it empties into Tatamagouche about half a mile below the village. This little wharf, which cost about \$600, is 96 feet long and 20 feet wide, consisting of al-

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ternate blocks of open face round log cribwork and spans of 20 feet each. At the outer end where there is 7 feet of water at L.W.O.S.T., there is a block of cribwork 30 feet long, 20 feet wide. Spring tides rise here 7 feet, neaps, 5 feet. During the fiscal year 1899-1900 the sum of \$246 was expended in renewing the whole floor of the wharf with planking, guards and stringers, and on the outer block three tiers of logs were added to raise it to the level of the rest of the work. Total expenditure to 30th June, 1900, including dredging, \$18,851.48.

## TANCOOK.

Big Tancook Island is the largest of a host of islands in Mahone Bay on the coast of Lunenburg County. It is about  $2\frac{1}{2}$  miles in extreme length north and south, by about a mile in extreme width east and west. It is nine miles north-east of the town of Lunenburg; the same distance south-east from Chester, and about  $2\frac{1}{2}$  miles south west of the extremity of the Aspotogon Peninsula, which is the nearest main land. The island has a population of about 600 people, for the most part dependent upon fishing, but doing a considerable amount of farming in the way of raising early vegetables. The breakwater, which is situated on the north-western side of a large cove on the northern end of the island, was built in 1873 at the joint expense of the Department of Public Works and the Provincial Government, each having expended \$2,000.00. It is 200 feet long, with a spur at its outer end having a face length of 95 feet, and is built partly of piles and partly of cribwork, the first 165 feet being of cribwork and the remainder, including the spur or ell, of piles. In 1887-88 the sum of \$2,405.95 was expended in extensive repairs and renewals. The whole top of the cribwork portion of the work was renewed, and about two feet in length of the pile-work portion of the breakwater was almost entirely rebuilt; a row of close piling was also driven along the southern and western faces of the ell, and along 40 feet of the northern outside end of the main portion of the work. In 1899-1900, the whole work was much decayed, and the piles being much eaten away by the limoria, the Department expended the sum of \$1,308.23 out of an appropriation of \$1,500, in thorough repairs and renewals to the cribwork portion of the structure, and in a commencement of renewals to the pile work, but the appropriation was insufficient to restore the work to its former usefulness, or to make it safe against the attacks of the winter storms.

Total expenditure to 30th June 1900, including refund of \$2,000.00 to Provincial Government, \$7,631.11.

This work was transferred to control of Department of Marine & Fisheries on 12th June 1888.

## THREE FATHOM HARBOUR.

Three Fathom Harbour, Halifax county, is situated on the Atlantic coast about fifteen miles to the eastward of Halifax Harbour. It is formed by islands connecting gravel beaches and though small, is well sheltered from all quarters and the small vessels which frequent the coast can enter and leave it at all times of the tide. It is the rendezvous of a large number of fishermen, principally inhabitants of the surrounding country, and during the fishing season is a busy place.

To prevent the sea from breaking through the narrow shingle beach that separates the harbour from the Atlantic, the department, in 1878, built cribwork along the crown of the beach. The work was extended and repaired in 1889 and its total length is 1,050 feet; it is built throughout of round log cribwork.

During the year 1898, the sum of \$500.19 was expended in raising and thoroughly repairing 200 feet in length of the work that had been undermined by the sea. The work still requires an expenditure of about \$500.00 for further

## SURETTE'S ISLAND.

SURETTE'S Island, Yarmouth county, is situated 13 miles south-east from the town of Yarmouth.

During the fiscal year 1887 a wharf 100 feet in length and 25 feet in width was built, and has already proved of great benefit to the locality.

No important repairs were made on this wharf since 1887.

Total expenditure to 30th June 1900 is \$960.12.

## SUMMERVILLE.

Summerville is a village of some four or five hundred people, situated on the right or east bank of the Avon River, about midway between Windsor, the county town of Hants, and the mouth of the river where it empties into the Basin of Minas. It is about four miles south of Cheverie. The prosperity of the place is chiefly due to ship-building, which up to a few years ago was carried on with vigor and success, but since the decline of the industry the inhabitants have turned their attention to farming, to which the district is well adapted, though there is still a good deal of general ship-repairing done in the yards. The public wharf was built about the year 1866 by the inhabitants aided by the Provincial Government, its dimensions being 275 feet long, 29 feet wide and 20 feet high at the outer end. It is constructed of the ordinary round log cribwork, well fendered and filled with ballast. In 1886-87, the work having become almost useless for want of renewals and repairs, Messrs. E. Churchill & Sons, of Hantsport, who own and operate a small steamer making semi-weekly (now daily) trips between Avon River and Basin of Minas ports, repaired the outer end and built an extension, about 36 feet long and 25 feet wide, having on the eastern side an inclined landing for the use of the steamer when lying alongside at low water. In 1890, the Department expended the sum of \$3,414.52 in removing and rebuilding the decayed top of the work to a height of 6 feet, besides placing new fenders along the whole length and making general and much needed repairs. The work is now 24 feet high at the outer end with 21 feet of water at H. W. O. S. T. (spring tides rise 48 feet, neaps 40 feet). In 1897-98 the sum of \$100 was spent in a few urgent repairs to the floor. In 1899-1900 the sum of \$600 was expended in renewing the whole floor with guards, planking and stringers, besides the bolting into position of a number of new fenders.

Total expenditure to 30th June 1900 is \$7,910.31.

## TATAMAGOUCHE.

The village of Tatamagouche, with a population of about 1200, is situated on the western side of the river of the same name, about 1 $\frac{3}{4}$  miles from its entrance into Tatamagouche Bay on the south side of the Strait of Northumberland. It is an important station on the Oxford & Pictou branch of the I.C.R., just half way between Oxford Junction on the main line, and Pictou. The surrounding country, being well adapted for agriculture, is thickly settled, and the surplus farm produce is shipped by small sailing vessels. The export of lumber and bark also forms an important item in the business of the place. At the village there are two small wharfs where all the business of the locality was formerly done, the inhabitants of the opposite, or east side of the river, being obliged to haul their produce round to the village by the bridge at the head of the harbour, a distance of three miles. To do away with this inconvenience and to promote the trade of the district, the Department in 1888 built a public wharf on the eastern side of the river at a point nearly opposite the mouth of the French River, where it empties into Tatamagouche, about half a mile below the village. This little wharf, which cost about \$600, is 96 feet long and 20 feet wide, consisting of al-



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ternate blocks of open face round log cribwork and spans of 20 feet each. At the outer end where there is 7 feet of water at L.W.O.S.T., there is a block of cribwork 30 feet long, 20 feet wide. Spring tides rise here 7 feet, neaps, 5 feet. During the fiscal year 1899-1900 the sum of \$246 was expended in renewing the whole floor of the wharf with planking, guards and stringers, and on the outer block three tiers of logs were added to raise it to the level of the rest of the work.

Total expenditure to 30th June, 1900, including dredging, \$18,851.48.

## TANCOOK.

Big Tancook Island is the largest of a host of islands in Mahone Bay on the coast of Lunenburg County. It is about  $2\frac{1}{2}$  miles in extreme length north and south, by about a mile in extreme width east and west. It is nine miles north-east of the town of Lunenburg; the same distance south-east from Chester, and about  $2\frac{1}{2}$  miles south west of the extremity of the Aspotogon Peninsula, which is the nearest main land. The island has a population of about 600 people, for the most part dependent upon fishing, but doing a considerable amount of farming in the way of raising early vegetables. The breakwater, which is situated on the north-western side of a large cove on the northern end of the island, was built in 1873 at the joint expense of the Department of Public Works and the Provincial Government, each having expended \$2,000.00. It is 200 feet long, with a spur at its outer end having a face length of 95 feet, and is built partly of piles and partly of cribwork, the first 165 feet being of cribwork and the remainder, including the spur or ell, of piles. In 1887-88 the sum of \$2,405.95 was expended in extensive repairs and renewals. The whole top of the cribwork portion of the work was renewed, and about two feet in length of the pile-work portion of the breakwater was almost entirely rebuilt; a row of close piling was also driven along the southern and western faces of the ell, and along 40 feet of the northern outside end of the main portion of the work. In 1899-1900, the whole work was much decayed, and the piles being much eaten away by the limnoria, the Department expended the sum of \$1,208.23 out of an appropriation of \$1,500, in thorough repairs and renewals to the cribwork portion of the structure, and in a commencement of renewals to the pile work, but the appropriation was insufficient to restore the work to its former usefulness, or to make it safe against the attacks of the winter storms.

Total expenditure to 30th June 1900, including refund of \$2,000.00 to Provincial Government, \$7,631.11.

This work was transferred to control of Department of Marine & Fisheries on 12th June 1888.

## THREE FATHOM HARBOUR.

Three Fathom Harbour, Halifax county, is situated on the Atlantic coast about fifteen miles to the eastward of Halifax Harbour. It is formed by islands connecting gravel beaches and though small, is well sheltered from all quarters and the small vessels which frequent the coast can enter and leave it at all times of the tide. It is the rendez-vous of a large number of fishermen, principally inhabitants of the surrounding country, and during the fishing season is a busy place.

To prevent the sea from breaking through the narrow shingle beach that separates the harbour from the Atlantic, the department, in 1878, built cribwork along the crown of the beach. The work was extended and repaired in 1889 and its total length is 1,050 feet: it is built throughout of round log cribwork.

During the year 1898, the sum of \$500.19 was expended in raising and thoroughly repairing 200 feet in length of the work that had been undermined by the sea. The work still requires an expenditure of about \$500.00 for further

repairs and to build a short return block on the end to prevent the sea getting around and attacking it in the rear.

Total expenditure to 30th June 1900 is \$5,522.25.

#### TIDNISH

The Tidnish River enters Bay Verte on the southern side and near its head. It is the largest stream entering the bay, and for a short distance from the mouth it forms the boundary line between the Counties of Westmoreland, in New Brunswick, and Cumberland, in Nova Scotia, the western shore being in the former and the eastern in the latter province.

Tidnish Head, about 1 $\frac{1}{2}$  miles to the eastward of the mouth of the river, is the eastern terminus of the Chignecto Marine Railway, now under construction.

On the 4th day of July, 1890, a contract was entered into for the construction of a public wharf on the south-eastern side of, and near the mouth of the river in Cumberland County, and it was satisfactorily completed on the 13th May 1891.

The wharf is 220 feet in length and 20 feet wide, with an L on the upper side of its outer end, 20 feet long by 20 feet wide. It is built of round timber, thoroughly ballasted and covered with plank, and its sides and end are well protected by fenders and fender piles.

Total expenditure to 30th June 1900 is \$2,164.45.

#### TRACADIE

Tracadie Harbour, Antigonish County, is on the southern shore of St. George's Bay, 12 miles east from Antigonish harbour and 11 miles west from the entrance to the Strait of Canso. It is separated from St. George's Bay by a series of islands and beaches of sand and gravel. Formerly the entrance was to the westward of Delorey Island, by a narrow and crooked channel with 2 feet at low water. In 1863 the Provincial Government opened a passage on the eastern side of the harbour, through a beach connecting the mainland with Delorey Island and constructed a breakwater on its eastern side.

In 1874-75 the Department repaired and extended the breakwater, and constructed a retaining wall to the southward of it. Repairs were made from time to time up to 1884-85 when the breakwater was repaired and strengthened by close-piling, and the retaining wall, which had been destroyed, was reconstructed.

The breakwater was badly damaged in 1889, and the following year the whole of it, with the exception of a portion of the south face 67 feet in length, was destroyed. In 1892-93, fifty feet of the south face of the breakwater was repaired and strengthened by close piling.

The destruction, in 1890, of the greater portion of the breakwater, involved the shifting of the channel at the entrance, (originally carrying 6 feet at low water) 500 feet to the westward, and the wasting of the beach, and consequent loss of land by erosion, to the eastward. The channel has since worked back nearly to its former position, but has a depth of only 5 feet at low water. To prevent further loss of land and to improve and protect the entrance, it was decided to reconstruct the breakwater, and for this purpose the sum of \$3,500 was granted for expenditure in 1898-99. The work proposed included repairing and strengthening the remaining portion of the old work and the construction of a side extension 100 feet in length (16 feet in width on top over the inner 64 feet), and 20 feet in width over the remaining 36 feet over a bottom of 2 feet above low water at the inner end, and 2 feet below low water at the outer end, and of the amount appropriated the sum of \$2800.62 was expended in procuring the materials required in the construction of the works proposed, and in placing and ballasting the creosoted timber substructure of the 100 foot extension.



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During the last fiscal year, the sum of \$933.22 was expended in completing the work commenced in 1898-99.

The re-construction of the breakwater has already had the effect of restoring the beach to the eastward nearly to its original condition, and to deepen the channel at the entrance.

Total expenditure to 30th June, 1900, including \$1,228.69 refund to Provincial Government and dredging, is \$23,561.71.

This work was transferred to control of Department of Marine & Fisheries on 12th June, 1888.

## TROUT COVE.

Trout Cove, Digby County, is a small indentation about 1,000 feet long and 600 feet deep, on the Bay of Fundy coast of Digby Neck. It is about midway, and has the only breakwater affording shelter to fishing boats, between Digby Gut and Petite Passage, being 18 miles south-west from the former. The settlement at and near the cove, which is called Centreville, has a population of about 300 people engaged in fishing and farming. The fishing fleet comprises 25 to 30 boats of 16 to 18 feet keel, and there are also owned here two schooners of about 30 tons each, which, during the season run to and from St. John, Halifax, Yarmouth and Lunenburg with produce, fish, lumber, flour &c. There is a factory for the canning of Finnan haddies and kippered herring, which is doing a large business. Within a short distance of the cove is excellent fishing ground for cod, haddock, hake, lobsters &c. A breakwater was begun in 1856 by the inhabitants aided by the Provincial Government, the work as then built being 200 feet long and 30 feet wide. In 1876 it was extended by the Department a distance of 178 feet. In 1880-81 extensive repairs were made to the old portion of the breakwater, of which 100 feet had been destroyed in 1879; in 1882-83 general repairs were made at a cost of \$249.17; in 1885-86 \$100, was spent in repairing the inner portion which was much weakened by heavy seas; 100 feet of new facing was built, the break renewed and strengthened, and some ballast placed in the outer end of the work. In 1887-88 140 feet of the inner portion of the seaward face was rebuilt from the beach to the top of the break; part of the flooring was renewed, and other necessary repairs carried out at a total cost of \$1,991.75. In 1888-89 the sum of 399.79 was expended in repairing the inner end of the work, the beach having washed away and exposed the foundations. About 1886 the inhabitants built a small block of cribwork 24 feet long, 15 ft. wide and 9 ft. high, at the shoreward end of the north side of the breakwater for the purpose of protecting it and the adjoining bank, on which is situated a large fish house and store. In 1891-92 the outer end of the breakwater was repaired at a cost of \$100. In 1894-95 the sum of \$81.50 was expended in rebuilding a small block of cribwork on the north end of the north side of the work, and in placing about 100 tons of ballast in the shore end of the breakwater to replace that washed out by the heavy winter storms. In 1896-97 the sum of \$3,990.02 was expended in thorough repairs and renewals; 130 feet in length of the inner side of the shore end was taken down and rebuilt in new timber; 80 feet in length of the seaward side of the outer end was close fendered, and the whole work was refloored. The middle 100 feet in length was also raised 2 feet in height, to make up for settlement. The shoreward half of the inner face was close sheathed to prevent the brook from undermining the work, and the outer face was re-enforced and new fendered. On the 12th of April 1898, a contract was awarded to Messrs. Reid & Archibald, for the sum of \$3,986 for the extension of the breakwater a length of 100 feet. The work which is thoroughly well and substantially built was not finished until September 1899. The work is now 474 feet long on the north side. It is 30 feet wide on top, and at the outer end 20 feet high, where

there is 24 feet of water at H. W. O. S. T. In 1898-99 the sum of \$41.12 was expended in protecting with cribwork and stone the shoreward end of the breakwater, which had been slightly damaged by a storm in the middle of January. In the fiscal year 1899-1900 the sum of \$700.00 was expended in building a block of crib-work for the protection of the shoreward end of the breakwater, 56 feet long, 16 feet and 13 feet high.

Total expenditure to 30th June 1900, including refund of \$685.00 to Provincial Government, \$17,462.74.

This work was transferred to control of Department of Marine & Fisheries on 12th June 1888.

#### TUSKET WEDGE.

Tusket Wedge is in the southern part of Yarmouth county and about 13 miles from the town of Yarmouth.

The wharf commenced by the Government of Nova Scotia some years ago at this place and continued by the inhabitants, never having been completed, was taken in hand by the department and completed in October 1884, and has already proved of great benefit to the locality.

Total expenditure to 30th June 1900, including refund of \$695 paid to Provincial Government, \$1,544.98.

This wharf was transferred to control of Department of Marine and Fisheries on 12th June 1888.

#### VICTORIA HARBOUR.

Victoria Harbour, King's county, is situated at the mouth of Church Vault Brook, on the southern shore of the Bay of Fundy, about ten miles east of Margareville. The pier is 240 feet long and 25 feet wide, with an approach 328 feet long faced with cribwork. It was begun in 1864 and finished in 1867, having been built by the inhabitants, assisted by the Provincial Government. In 1878 the sum of \$1,000 was expended by the Department in repairing the work and raising it a height of 4 feet. Slight repairs were made in 1891 and 1893.

Total expenditure to 30th June 1900, including refund of \$450 paid to Provincial Government, \$1,624.98.

This work was transferred to control of Department of Marine and Fisheries on 12th June 1888.

#### WALLACE.

Wallace Harbour, Cumberland County, is situated on the south side of the Straits of Northumberland, about midway between Pictou Harbour and Bay Verte. It is at the mouth of Wallace River and is well protected from all winds. On the south side of the harbour, which is three-quarters of a mile wide, is situated the village of Wallace with a population of about 800 people. The industries of the place are chiefly farming and the quarrying and export of freestone, of which there are large and valuable beds in the immediate neighbourhood.

To facilitate communication with the north side of the harbour, a thickly settled district, the department in March, 1897, awarded a contract for the construction of a ferry wharf for the sum of \$2,329. This wharf was finished in September, 1897, it is a composite structure 320 feet long, the shoreward 170 feet being of block and span work 18 feet wide, and the outer 150 feet of pile work. The outermost 90 feet is built of double width so as to form an inclined slip where the ferry boat can lie at any stage of tide.

Total expenditure to 30th June 1900 is \$6,331.68.

This ferry wharf was transferred to control of Department of Marine & Fisheries on 30th November 1892.

## WALTON.

Walton Harbour, Hants County, is the outlet of the La Tete River, and is situated on the southern shore of the Basin of Minas, Bay of Fundy, about 14 miles to the westward of Noel Bay, and 14 miles to the north-eastward of Chevre at the mouth of the Avon River.

A contract was entered into in December, 1890, for the construction of a breakwater on the eastern side of, and near the mouth of the harbour, 250 feet long and 20 feet wide, sloping 1 in 8 on the inside, and 1 in 2 on the outside, for the purpose of forming a harbour inside.

The work was carried on in a very vigorous manner, and at the end of the fiscal year 1891 the bottom of the outer end for a distance of 130 feet inward had been built up to an average height of 6 feet and thoroughly ballasted.

Total expenditure to 30th June 1900 is \$6,838.89.

## WEST ARICHAT.

West Arichat, Richmond county, is a small but safe harbour on the south side of Isle Madame, sheltered from the south and west by Chrichton Island and a breakwater between it and the mainland.

The breakwater is 1,285 feet in length and 23 feet in width. A portion of it extending 628 feet from the island was built by the Provincial Government in 1867, and the remainder by the department in 1879. It is of round timber, open-faced, and was fully ballasted. The top of the covering is 11 feet above the bottom, which dries at extreme low water except near a 25 foot opening between the old and the new work; and 6 feet above extreme high water.

In 1883-84, fenders were placed on the south face 3 to 9 inches apart for a distance of 490 feet; in 1891-2, the covering over 140 feet at the west end, and 120 feet at the east end, was renewed along the centre line.

In 1892-3, 80 feet of the south face, at the west end, was repaired and close-fendered, 92 feet of the north face at the west end was reconstructed, and all other necessary repairs were effected with the exception of renewing about 11,000 feet B. M. of covering along the side of the work and replacing 150 cubic yards of ballast.

The expenditure up to the end of the fiscal year 1897-8, amounted to \$15,309.67, of which \$2,000 was a refund of amount expended by the Provincial Government and \$11,294.29 may be charged to construction account and \$2,015.38 to repairs.

During the year 1898-9 the sum of \$685.39 was expended in repairs and renewals, including placing 480 cubic yards of ballast in the seaward face chambers; renewing 15,000 feet B. M. of 3 inch covering at the sides of roadway; placing a guard rail on the north side from end to end of the covered portion, and 26 fenders on the south face near the west end; and repairing and strengthening the corners of the work on each side of the opening.

Total expenditure to 30th June, 1900 including refund of \$2,000 to Provincial Government \$15,995.06.

This work was transferred to control of Department of Marine and Fisheries on 12th June, 1888.

## WESTERN HEAD.

Western Head is one of the most important shore fishing settlements in Queen's county. It is situated on the southern side of Liverpool Bay, about 4 miles to the south of the county town of Liverpool.

Projecting from the head is a broken rocky ledge which formed a partial shelter, enabling fishermen to land with their boats in moderate weather, but the difficulty always was that the fishermen were not only prevented from launching

their boats in rough weather, but had to run great risks in effecting a landing when they were caught on the fishing grounds in sudden storms.

In 1887 the department began the construction of a stone breakwater in the rear and partly in the space sheltered by this rocky ledge. The breakwater was built of large quarried stone laid and bolted together, and when completed its length was 190 feet and its width 40 feet on top. Soon after its completion, however, a severe storm carried away 100 feet of the outer end of the work.

In 1889-90 this work was rebuilt; and owing to the depth of water inside the reef and the difficulty in securing a foundation, it was decided to rebuild on top of the reef, the whole of which uncovers at low water ordinary spring tide. The projecting points of the reef were cut away and a bed prepared for the foundation course which was bolted down to the bed rock and the interstices between the stones filled in with Portland cement concrete. Each succeeding course was laid in a similar manner, the top of the breakwater being carried up 5 feet above high water ordinary spring tide, and the surface finished smooth. Where the new work and the old join, the breakwater is 40 feet wide to 29 feet where it joins the reef. The part rebuilt is 106 feet in length, and the total cost of the above mentioned work of construction and improvements amounts to \$12,025.96.

In 1898-9 the sum of \$965.79 was expended in repairing this breakwater as the constant action of the waves had gradually weakened the structure. The work done consisted in the practical reconstruction of a portion of the breakwater, 90 feet in length, 29 feet wide and of an average height of 8 feet, besides placing other portions of the work in a thorough state of repair.

Total expenditure to 30th June 1900 is \$12,990.75.

#### WEST JORDAN BAY

Jordan Bay, Shelburne County, is situated midway between Lockeport and Shelburne Harbour. On the west side of the bay, about one mile to the southward of Jordan Point, there is a deep land-locked pond of salt water which, until a few years ago, formed a safe and convenient harbour for fishing boats and schooners. The waters of this pond are separated from those of the outer bay by a high, narrow gravel bar, through which formerly there was a deep channel. This channel had for many years been getting narrower until, about the year 1881, it closed up entirely during a heavy south-easterly storm.

During the Session of 1888-89, an appropriation of \$1,200 was made for the purpose of re-opening the harbour, and during the fiscal year 1890 this was successfully accomplished.

The bar being composed of shifting gravel, it was not considered advisable to attempt to open the old channel, for unless expensive protection works were built on one, if not both sides of the cutting, it would in all probability immediately close up again. Advantage was therefore taken of a small "high water passage," which had been deepened in part by the inhabitants, and this was deepened, straightened, and otherwise improved.

A cutting, 170 feet long, 35 feet wide on the bottom and about 52 feet on top, with an average depth of 3 feet 8 inches, was made, and now fishing boats can pass through at all times of tide, and schooners as large as 40 tons can enter at high water. Spring tides rise at this place 6 feet 9 inches, and neaps 12 inches less.

To guard against any future obstructions by gravel the balance of the appropriation was expended in constructing a pier on the back of the island. This pier is constructed of round timber and is 144 feet long, 18 feet wide and 13 feet high at the outer end.

No important repairs have been made since 1890.

Total expenditure to 30th June 1900 is \$1,999.95.

## WEST PUBNICO.

West Pubnico is at the south-eastern end of Yarmouth County, and about 30 miles from the town of Yarmouth.

In 1886, for the purpose of affording wharf accommodation for the numerous fishing boats engaged at this place, Parliament voted the sum of \$1,000, and this amount was expended in connecting a small island, distant from the shore about 300 feet, with it by a stone embankment, 25 feet in width.

By the construction of a pier farther out towards the channel, a depth of 12 feet at high tide would be reached in a distance of 400 feet, and the accommodation required be gained.

In 1887, the work referred to, was extended a distance of 230 feet, the extension consisting of a pile wharf 25 feet wide.

No important repairs were made since 1892.

Total expenditure to 30th June 1900 is \$2,248.62.

## WHITE POINT.

White Point is a small fishing settlement on the Atlantic coast of the county of Queen's, about 6 miles south of Liverpool, the county town. At this place a breakwater was constructed over 25 years ago by the inhabitants, assisted by grants from the local government, which affords the only protection to fishing boats in the neighbourhood, and is a small structure of stone-filled crib-work 180 feet in length, from 10 to 20 feet in width and about 13 feet in height at the outer end.

In 1878 an expenditure was made by the department in lengthening the structure and in the removal of a number of large granite boulders from the area sheltered, and in 1879 the work was strengthened and repaired.

During 1882-3 the outer portion of the old work which had been completely demolished during a storm, was rebuilt and repairs were executed on other parts of the structure, and in 1884 further expenditure was made on repairs.

In 1886 it was found that the outer blocks had been carried away, and the ballast they contained, as well as a portion of the stone slope on the seaward side, had been carried into and deposited over the area sheltered by the breakwater, and the sum of \$470.53 was expended in its removal and in closing in the damaged end of the work; and a further expenditure of \$1,004.92 was made during the ensuing year for the same purpose.

During 1888-9 the sum of \$2,499.46 was applied in excavating a dock, or landing place for boats, 100 feet in length and extending inwards 60 feet from original high water mark.

In November, 1893, the sum of \$349.56 was spent in a practical rebuilding of about 10 feet in length of the outer south corner of the breakwater and refilling with ballast, placing and spiking about 12 feet in length of close sheathing on the outer side, laying a few new floor timbers and planking and placing about 70 tons of heavy rip-rap along the outer side of the work, to break the force of the heavy seas.

During the year 1898-9 the sum of \$902.26 was expended in practically rebuilding the breakwater which is now 192 feet long, 14 to 25 feet wide, and 13 feet high at the outer end. Many large rocks and stones were also removed from the inner dock, and a ledge blasted, with dynamite, which endangered the safety of their only landing place in times of stormy weather or during heavy seas or swells. The crib-work, when stripped, proved not only to be decaying above high water, ordinary spring tide, but also below that point; the destructive little worms known as the limnoria had completely destroyed the timber, thus entailing the practical reconstruction of the entire work. As this was the only place where the fishermen of this settlement and others contiguous thereto could land their catch, the value of

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this breakwater, in affording to these people convenient shelter for their boats, cannot be overestimated.

The total expenditure incurred for works at this place up to June 30, 1900, amounts to \$13,868.26, of which amount \$9,147.93 may be charged to construction and improvements, including a refund of \$1,643.55 made to the local government, and \$4,720.33 to repairs.

This work was transferred to control of department of Marine and Fisheries on 12th June, 1888.

#### WHITEWATER.

Whitewater, Kings county, is a small farming and lumbering settlement of some two or three hundred people, situated on the west coast of the Basin of Minas, about three-quarters of a mile south of Cape Blomidon and 10 miles north-east of the village of Canning.

To facilitate the shipping of lumber and for general purposes the department expended during the year 1898 the sum of \$3,999.08 in constructing a public wharf 285 feet long, 20 feet wide, and has an ell on the outer end 35 feet long, where there is, at high water of ordinary spring tides, a depth of 17 feet. The rise of the tide here being 30 feet, the wharf is high and dry at low water. It is constructed of block and span work, the blocks being of solid cribwork 19 feet in width and the spans 14 feet in clear opening. The work was well and cheaply built by days' labour.

Total expenditure to 30th June, 1900, is \$3,998.90.

#### WHYCOCOMAGH.

Whycocomagh, Inverness Co., is a thriving village on the west side of a bay of the same name at the head of St. Patrick's Channel, an arm of the Bras d'Or Lake, and a convenient place of shipment for Lake Ainslie, Skye Glen, and other agricultural districts of central Inverness.

The wharf at this place, purchased by the Department in 1897-98, together with a warehouse, and a right of way to the highway for the sum of \$3,000, was originally a block and span structure extending over a bottom of soft mud or silt varying in depth from one foot at the inner to 19 feet at the outer end, 200 feet to 9 feet at low water level, and to within 35 feet of channel dredged in 1884, to 12 feet 6 inches at low water. In 1899-1900, 144 feet was reconstructed, with side and end walls of rubble masonry and centre filling of stone; and in 1892 the outer portion, 55 feet 9 inches in length, was repaired and extended 10 feet with pile work.

The sum of \$1,000 was appropriated for expenditure during 1898-99 in reconstructing the outer portion of the wharf. The work proposed included reconstructing the outer 60 feet with pile work, and the construction of a pile head 60 feet in length and 25 feet in width. Of the amount appropriated, \$988.11 was expended in procuring nearly all materials required, and in completing the work, with the exception of placing part of the covering and guard rails and a few guard piles.

During the fiscal year 1899-1900, the sum of \$500.11 was expended in completing the reconstruction of the outer portion of the wharf and in repairing the roof of the warehouse.

The work performed included driving and securing 35 guard piles and two mooring piles; procuring, driving and securing three mooring piles; procuring and placing 3,500 feet B.M. of 3-inch covering; slight repairs to the approach, and covering the roof of the warehouse with cedar shingles.

Total expenditure to 30th June, 1900, is \$7,492.58.

## WILLOW COVE.

Willow Cove, Queen's County, is at the head of Port Mouton Harbour.

A breakwater 140 feet in length was built during the year 1888 at this place for the protection of fishing boats, especially of the larger class, as the anchorage is soft and bad.

No important repairs made on this breakwater since 1888.

Total expenditure to 30th June, 1900, is \$1,796.97.

## WINDSOR.

Windsor, the county town of Hants, with a population of about 4,500 people, is an important town situated at the head of the estuary of the river Avon on the D. A. Railway, 46 miles north-west from Halifax. The shipping registered at the port for the year ending December, 1896, amounted to about 131,000 tons annually. A couple of million feet B. M. of lumber also forms part of the exports by water. Up to twelve or fourteen years ago the wharfs of the town were comparatively free from mud, and at high water large vessels could lie alongside to load or discharge. Within the last few years, owing partly no doubt to the construction of the new highway bridge, of which the piers are located without due regard to their effect on the current, the mud has accumulated in front of the wharfs to such an extent that it is only at extreme high tide that moderate sized vessels can approach or leave the wharfs. Several of the leading shippers and merchants have on more than one occasion spent from two to three hundred dollars in digging and removing the mud from their wharfs, but it soon again deposits, rendering the expenditure useless. With the object of scouring away the accumulated mud from the wharfs, the Department in 1897-98 expended the sum of \$3,299.71 in constructing a training weir, extending down stream from the corner of the Falmouth abutment of the road bridge at an angle of 45 degrees with the bridge. The weir is constructed of brush mattresses at the bottom with sufficient stone to keep them in place and with crib-work on top of them. The thickness of the brush mattresses with their load of stone is from 3 to 6 feet. The average depth of the main or under crib is from 5 to 8 feet and the uniform height of the A shaped top crib is 7 feet. The sloping sides of the top of the work are sheathed with 3" birch plank, and the crest, which is a right angle, is covered with a 6"x6"x $\frac{3}{8}$  steel angle securely bolted through the plank to the ridge piece. The work is built on shifting quicksands, and, owing to the great rise and fall of the tide—about 50 feet—and to the great velocity of the current at ebb and flood tide, the work has been constructed under great and peculiar difficulties. At the close of the fiscal year 1898-99, during which the work was continued at an expenditure of \$4,198.24, there was a length of 260 feet of the weir finished. For a further length of 65 ft. the brush mattresses with their load of stone were sunk ready for the cribs. Altogether, the work done in 1898-99 was equivalent to 240 feet in length of finished weir. In addition to the work upon the training weir, a considerable quantity of the rock ledge at Smith's Point, separating the Avon and St. Croix Rivers, was removed, as well as portions of the old pier foundations of the old highway bridge. The object of the former work was to induce the flood tide to seek the Windsor side, and meet the channel being slowly made by the training weir. The object of the latter was by increasing the water way on the Windsor side to cause a larger volume of the ebb current to exercise its scouring action on the mud in front of the Windsor wharfs. In the fiscal year 1899-1900 the sum of \$2,000.00 was expended in continuing and completing the work to its originally designed length of 600 feet. The training weir, aided by the works of removing the rock at Smith's Point and the old pier foundations of the former highway bridge, is undoubtedly, though much more slowly than was anticipated, effecting its designed purpose in the scouring away

of the mud in front of the Windsor wharfs, but it will be a matter for serious consideration whether it will not be advisable at an early date to extend it a further length of about 200 feet.

Total expenditure to 30th June 1900 is \$9,627.54 and for improving the Avon River, last fiscal year, \$4 168.49 more.

YARMOUTH HARBOUR (STANWOOD BEACH).

Yarmouth, the County town of Yarmouth County, is situated at the south-western extremity of Nova Scotia. It is a thriving and prosperous town of nearly 7,000 inhabitants, and, next to Halifax, the largest and most important in the province of Nova Scotia. It is the terminus of the Dominion Atlantic Railway, and the headquarters of the Yarmouth Steamship Company, the fine Clyde built steamers of both of which Companies, make regular trips throughout the year to Boston. There are several important manufacturers in the place but the leading business is shipping, of which a larger tonnage is owned here than in almost any other locality in Canada.

At low water, Yarmouth Harbour, in which spring tides rises 16 feet, neaps 13 feet, consists largely of mud flats covered with grass. The harbour is formed by a succession of shingle and gravel beaches, (called Stanwood Beach), aggregating about one mile in length, which connects the northern end of Cape Fourchu Island, also about a mile long, with the southern end of Stony Point on the mainland, and separate the harbour from the Bay of Fundy.

In 1867, it was found that part of the beach between Cape Fourchu and Stony Point was gradually wearing down, and unless this action were arrested the sea would eventually sweep away the beach and destroy the harbour. The Government of Nova Scotia began the work of protecting the beach in 1867 by constructing 200 feet of crib-work at Stony Point. Between 1873 and 1875 the Public Works Department constructed the remaining 2,800 feet of protection work required to reach Cape Fourchu, and added buttresses or groynes to stop the movement of the gravel.

Between 1875 and 1888, the protection works, although substantially built of stone-filled cribwork and close-piled on their seaward faces, had to be repaired and strengthened at various intervals, the expense amounting to over \$25,000.

Between 1888 and 1896 no further works of repair were undertaken on the beach protection, which became dilapidated and decayed; breaches being made through it by the sea at various places. During the fiscal year 1896-97 the sum of \$2,983.62 was expended in carrying on the most urgent works of repair, and in 1897-98 a further sum of \$3,234.51 was expended in continuing and completing these repairs. This last sum was applied in rebuilding a length of 50 feet at the eastern end of the protection work, and constructing a groyne, projecting at right angles from the same end, for a distance of 175 feet. The groyne is 25 feet wide and 11 feet high, substantially built of round log, and stone-filled cribwork. Its object was to protect the beach at the north-eastern end of the main cribwork protection, by accumulating the gravel and breaking up the waves before they expended their force on the beach. It has admirably fulfilled its purpose, as gravel has accumulated at the junction of the groyne with the main work to a depth of over 14 feet.

In 1898-99 the sum of \$300.00 was expended in repairing a small but serious breach, 25 feet long, in the bottom of the outer face of the beach protection work, and in covering with 3-inch hemlock plank a length of 430 feet of the top of the work, in order to prevent the gravel from being washed out by the waves.

In 1899-1900 the sum of \$970.27 was expended in repairing two or three small but dangerous breaches in the seaward face of the work and in covering the top for a length of about 670 ft with 3 inch plank to prevent the sea from washing out the ballast.



## SESSIONAL PAPER No. 19

Total expenditure to 30th June 1900, including refund of \$1311.95 to Provincial Government and dredging is \$100,479.01.

## YOUNG'S LANDING.

Young's Landing, Lunenburg County, is situated on the western shore of Prince's Inlet, Mahone Bay, about three miles north of the town of Lunenburg. The district is thickly settled all about and is excellent farming country. The wharf was built here before Confederation by the Provincial Government. It was 132 feet long and 22½ feet wide, built of block and span work. In 1899-1900, the work having become almost a complete wreck, the Department expended the sum of \$795.58 in re-building the wharf on the same site as the old. The new work, which is also of block and span, is 87 feet long, 22 feet wide and 12 feet high at the outer end, exclusive of the stone and gravel approach about 60 feet long.

Total expenditure to 30th June 1900 is \$795.58.

## PRINCE EDWARD ISLAND PIERS.

## NORTH COAST—NORTH POINT TO EAST POINT.

The harbours on the north coast of Prince Edward Island are all of the same character, being obstructed by bars of shifting sand lying at various distances outside their mouths. With the exception of Malpeque, they are navigable for only small vessels, and are practically inaccessible during storms when there is a heavy sea running, as the breakers then extend quite across, leaving no visible channel.

These bars form a great impediment to the successful prosecution of the shore fisheries. The boats, when fishing in the offing, are obliged to run for the harbour on the approach of a storm much sooner than they would were the navigation clear in order to get across the bar before the sea begins to break on it. After the wind subsides they are prevented from leaving the harbor until the sea on the bar has gone down. In this way it is estimated that one-third of their time, and frequently the best of the fishing, is lost.

Most of the works on this coast have therefore been designed for the purpose of deepening the water on the bars and maintaining permanent channels.

## ANNANDALE.

Annandale Pier, King's County, is situated on the north side of Grand River, near its entrance into Boughton Bay; it consists of a shore abutment, or approach 300 feet long by 22 feet wide, and a pier head of 140 feet long by 36 feet wide fronting on the channel where a depth of 7 feet at low water or 12 feet at high water springs (which here rise 5 feet) is carried. The approach excepting on a short span of 18 feet which is floor stringered and planked over is constructed of close faced timber work filled in with brush, stone and clay the latter forming the roadway, while the pier-head is formed partly of crib work and partly of pile bents, this latter being on its outer half, all of it being floor stringered and planked over.

The work is one of the Prince Edward Island Piers control of which was assumed by the Dominion Government in 1883-84 and when the sum of \$2,474.25 was paid the Prince Edward Island Government to recoupe it for the monies that

had been expended in keeping it in repair from 1873, date on which the Island entered Confederation. The work when assumed by the Department being a very old structure and much out of repair, besides which being exposed to the destructive action of the 'toredo' some expenditure has been required almost yearly to keep it passable for traffic up to the close of 1898-99 the sum of \$1,719.97 being so applied, and making with amount of \$39.93 spent last fall in temporary repairs and strengthening of its different parts of pier-head where 320 line feet of floor stringers, 29 piles (or rather small supports) and 300 feet B. M. plank laid.

Total expenditure to 30th June 1900 \$1,234.00.

This pier was transferred to control of Department of Marine and Fisheries on 24th August, 1888.

#### BAY FORTUNE

Bay Fortune Harbour, King's County, is situated on the south side of Rollo Bay on the east coast of the island and about 5 miles south-west from Souris, the eastern terminus of the Prince Edward Island Railway.

There was expended during the year 1895 for the preservation or improvement made in the depth of the water on the bar at the entrance, a further sum of \$7,500. The work done consisted in levelling up with squared timber from 1 foot to 1.5 feet high and 250 feet long the channel side of the portion of the breakwater built by the department in 1842-93, putting in protection of brush and stone in the bottom driving fender piles at 3 feet centres, and constructing new block of cleaved timber, fully ballasted, at the outer end in order to prevent scour caused by the increased current occasioned by the extension of breakwater, that was found to be undermining it. The inner end of the work has also been connected with the public wharf at the point of the bar by a beach protection of timber, brush and stone, to prevent the formation of a channel.

Much benefit is said to have resulted from the extension, &c., of the breakwater, the depth of water over the bar having increased 2 to 3 feet, thus permitting vessels drawing as much as 10 to 12 feet entering and leaving the harbour at high water.

No important repairs made since 1895.

Total expenditure to 30th June 1900 \$3,484.42.

#### BAY VIEW.

Bay View Pier Queens Co., is situated on the eastern side of, and near the mouth of the Hope River that enters New London Harbour about 3½ miles south east from the Harbour entrance. The pier has a length in all of 503 feet, 409 feet from the shore outwards being 20 feet in width, this increasing gradually to width of 35 feet at the outer end; it is not exposed to any heavy sea but extreme high tides, when occurring during storms, owing to the work being about two feet low, usually cause damage to the roadway which on narrow portion is formed of clay and gravel filling, damage of this nature occurred during the past fall, when the tide rose higher than it had for many years, the outer end or pier head which is floor stringered and planked being also damaged, repair of which was made at the time at a cost of \$84.28, consisting of the making up of the roadway with broken stone, and replacing floor stringers and planking.

The pier is one of those the control of which was assumed by the Department in 1883-84 when the sum of \$1,599.00 was paid the Local Government to recoup it for sums expended on repairs from 1873 to that date, since when, as the work at that time was in very bad condition, expenditures were required in all of \$1,306.18 between 1885 and 1898 to keep it in serviceable condition.

Total expenditure to 30th June 1900 \$2,989.46.

## SESSIONAL PAPER No. 19

This pier was transferred to control of Department of Marine & Fisheries on 25th August 1885.

## BELFAST (HALIDAYS').

Belfast Pier, Queen's County, locally known as "Haliday's Wharf," is situated on the south side of Orwell Bay about one mile from the village of Eldon. This pier, constructed by the Government of Prince Edward Island previous to Confederation, was taken over by the Federal Government in 1883. Besides affording shipping facilities for the neighbourhood, it is also a port of call for the steamers of the Prince Edward Island Navigation Company plying, during the season of navigation, tri-weekly, between Charlottetown and Orwell Bay. It has a length of 500 feet and, at its outer end stands a head block forming an L which is 25 feet to 30 feet in width and 145 feet in length along the channel, where a depth of about 5 feet now obtains at low water spring tides, or 14 feet at high water.

The pier-head had originally a length of 140 feet, but when retopped in 1889 was shortened 10 feet; the result being that the submerged remains of the old work at its north-eastern end rendered this part unserviceable during low water owing to danger of vessels being damaged when approaching the pier. In 1897-8 a new block, 28 feet wide by 15 feet long and of an average height of 15 feet was added to the pier head at the eastern end so as to cover the obstructing ballast and timbers. General repairs were also made on the roadway and the expenditure incurred in the said year for these repairs and the construction of the new block amounted to \$499.45.

At the close of the fiscal year (1897-8) a sum of \$4,854.49 had been expended which may be charged to "Construction and Improvements" including the refund of \$4,355.04 made to the Local Government in 1884-5 for their expenditure on the pier between 1873 and 1884 and a further sum of \$5,165.47 had been applied for repairs undertaken at various times, to keep the pier in a passable state for traffic; the greater portion of the work above low water was rebuilt.

During the fiscal year 1898-9 the sum of \$499.46 was expended in filling in a "span" or opening of 24 feet in length, that existed at about 200 feet inward of the pier head or L, and by which during westerly storms drift entered and was filling in the area protected. The filling of the span is made of close laid poles (placed lengthwise and cross-wise) and having on top, for about 3 feet, close faced timber work full ballasted. Thirty new fender piles were driven on the western side of the pier and the whole of the roadway approach (400 feet in length) made up with broken stone and gravel. Two new floor stringers were put on the outer part of the approach, and the whole of the planking of the pier head was repaired as found necessary; and the outer upper corner strengthened and fender-piled.

Total expenditure to 30th June 1900, \$10,529.42. This work was transferred to control of department of Marine and Fisheries on 24th August 1888.

## BRAE.

Brae Harbour, Prince County, is situated at the mouth of the Brae River, on the northern side of Egmont Bay, eight miles east of West Point and about six miles south of Coleman Station on the line of the Prince Edward Railway, which station is 36 miles from Summerside, the shiretown of the county. At the mouth of the river, an area carrying a depth of six feet at low water is well sheltered by Brae Island and would prove a good fishing station and harbour of refuge for small vessels, as well as a most convenient place of shipment for the surplus produce raised in the district, were it not that approach to it is obstructed by a sand bar, almost dry at low water, that extends completely across the entrance and

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had been expended in keeping it in repair from 1873, date on which the Island entered "Confederation." The work when assumed by the Department being a very old structure and much out of repair, besides which being exposed to the destructive action of the "toredo" some expenditure has been required almost yearly to keep it passable for traffic, up to the close of 1898-99 the sum of \$1,719.91 being so applied, and making with amount of \$39.93 spent last fall in temporary repairs and strengthening of its different parts of pier-head, where 320 lineal feet of floor stringers, 29 piles (or rather small supports) and 300 feet B. M. plank laid.

Total expenditure to 30th June, 1900, \$4,234.00.

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#### BAY FORTUNE

Bay Fortune Harbour, King's County, is situated on the south side of Rollo Bay on the east coast of the island and about 5 miles south-west from Souris, the eastern terminus of the Prince Edward Island Railway.

There was expended during the year 1895 for the preservation of improvement made in the depth of the water on the bar at the entrance, a further sum of \$7,500. The work done consisted in levelling up with squared timber (from 1 foot to 1½ feet high and 290 feet long) the channel side of the portion of the breakwater built by the department in 1892-93, putting in protection of brush and stone in the bottom, driving fender piles at 3 feet centres, and constructing new block of closefaced timber, fully ballasted, at the outer end in order to prevent scour caused by the increased current occasioned by the extension of breakwater, that was found to be undermining it. The inner end of the work has also been connected with the public wharf at the point of the bar by a beach protection of timber, brush and stone, to prevent the formation of a channel.

Much benefit is said to have resulted from the extension, &c., of the breakwater, the depth of water over the bar having increased 2 to 3 feet, thus permitting vessels drawing as much as 10 to 12 feet entering and leaving the harbour at high water.

No important repairs made since 1895.

Total expenditure to 30th June 1900 \$3,484.42.

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Bay View Pier Queens Co., is situated on the eastern side of, and near the mouth of the Hope River that enters New London Harbour about 3½ miles south east from the Harbour entrance. The pier has a length in all of 509 feet; 409 feet from the shore outwards being 20 feet in width, this increasing gradually to width of 35 feet at the outer end; it is not exposed to any heavy sea but extreme high tides, when occurring during storms, owing to the work being about two feet low, usually cause damage to the roadway which on narrow portion is formed of clay and gravel filling, damage of this nature occurred during the past fall, when the tide rose higher than it had for many years, the outer end or pier head which is floor stringered and planked being also damaged, repair of which was made at the time at a cost of \$84.28, consisting of the making up of the roadway with broken stone, and replacing floor stringers and planking.

The pier is one of those the control of which was assumed by the Department in 1883-84 when the sum of \$1,599.00 was paid the Local Government to recoup it for sums expended on repairs from 1873 to that date, since when, as the work at that time was in very bad condition, expenditures were required in all of \$1,306.18 between 1885 and 1898 to keep it in serviceable condition.

Total expenditure to 30th June 1900 \$2,989.46.

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This pier was transferred to control of Department of Marine & Fisheries on 25th August 1885.

## BELFAST (HALIDAYS').

Belfast Pier, Queen's County, locally known as "Haliday's Wharf," is situated on the south side of Orwell Bay about one mile from the village of Eldon. This pier, constructed by the Government of Prince Edward Island previous to Confederation, was taken over by the Federal Government in 1883. Besides affording shipping facilities for the neighbourhood, it is also a port of call for the steamers of the Prince Edward Island Navigation Company plying, during the season of navigation, tri-weekly, between Charlottetown and Orwell Bay. It has a length of 600 feet and, at its outer end stands a head block forming an L, which is 28 feet to 30 feet in width and 145 feet in length along the channel, where a depth of about 5 feet now obtains at low water spring tides, or 14 feet at high water.

The pier-head had originally a length of 140 feet, but when retopped in 1889 was shortened 10 feet; the result being that the submerged remains of the old work at its north-eastern end rendered this part unserviceable during low water owing to danger of vessels being damaged when approaching the pier. In 1897-8 a new block, 28 feet wide by 15 feet long and of an average height of 15 feet was added to the pier head at the eastern end so as to cover the obstructing ballast and timbers. General repairs were also made on the roadway and the expenditure incurred in the said year for these repairs and the construction of the new block amounted to \$499.45.

At the close of the fiscal year (1897-8) a sum of \$4,854.49 had been expended which may be charged to "Construction and Improvements" including the refund of \$4,355.04 made to the Local Government in 1884-5 for their expenditure on the pier between 1873 and 1884 and a further sum of \$5,165.47 had been applied for repairs undertaken at various times, to keep the pier in a passable state for traffic; the greater portion of the work above low water was rebuilt.

During the fiscal year 1898-9 the sum of \$499.46 was expended in filling in a "span" or opening of 24 feet in length, that existed at about 200 feet inward of the pier head or L, and by which during westerly storms drift entered and was filling in the area protected. The filling of the span is made of close laid poles (placed lengthwise and cross-wise) and having on top, for about 3 feet, close faced timber work full ballasted. Thirty new fender piles were driven on the western side of the pier and the whole of the roadway approach (400 feet in length) made up with broken stone and gravel. Two new floor stringers were put on the outer part of the approach, and the whole of the planking of the pier head was repaired as found necessary; and the outer upper corner strengthened and fender-piled.

Total expenditure to 30th June 1900, \$10,529.42. This work was transferred to control of department of Marine and Fisheries on 24th August 1888.

## BRAE.

Brae Harbour, Prince County, is situated at the mouth of the Brae River, on the northern side of Egmont Bay, eight miles east of West Point and about six miles south of Coleman Station, on the line of the Prince Edward Railway, which station is 36 miles from Summerside, the shiretown of the county. At the mouth of the river, an area carrying a depth of six feet at low water is well sheltered by Brae Island and would prove a good fishing station and harbour of refuge for small vessels, as well as a most convenient place of shipment for the surplus produce raised in the district, were it not that approach to it is obstructed by a sand bar, almost dry at low water, that extends completely across the entrance and

which is parallel with the shore and at a distance of about 400 feet out from the eastern end of the island.

In 1890, with a view of improving this harbour, the inhabitants of the surrounding district began the construction of a brush breakwater so as to contract the entrance, originally 800 feet wide, and deepen the same by the increased scour thus induced. They built a length of 350 feet wide, composed of poles, brush and some ballast with clay filling on top. To this the department added a length of 200 feet in 1891-92, and in 1895-96 repaired or, more properly, rebuilt the inner or original weak work constructed by the inhabitants.

As no benefit, as regards deepening by scour, had resulted from the work thus lengthened to 550 feet, and a further extension of at least 500 feet, being considered necessary to attain the desired improvement in the depth, it was decided to build during the year 1897-98 an additional length of 100 feet of breakwater. Most of the materials required for this addition were procured during the early part of the winter of 1897-98, with the intention of proceeding with the construction of the lower portion of the work through the ice in March, 1898, and finishing it by the close of the said fiscal year. Owing to the serious illness of the foreman in charge at the time when the condition of the ice was favourable for carrying on such work, nothing was accomplished further than procuring the materials required. The cost of these materials, together with some little labour performed in ice cutting, etc., amounts to \$514.64, making with the former expenditures for the 200 feet extension and reconstruction of the 350 feet of the original work, a total expenditure of \$2,505.49 up to June 30, 1898. \$1,461.19 may be charged to 'Construction and Improvements' and \$1,043.29 to 'Repairs.'

During the fiscal year 1898-99 the proposed 100 feet extension has been completed. This work has a width of 24 feet and averages 13 feet in height; it is built of open-faced square timber, floor-stringered and planked over, well ballasted and has sides and ends well protected by fender piling driven at about 3 feet centres. Moreover, the whole of the inner 350 feet of the breakwater was repaired, the roadway being levelled up with brush, broken stone and gravel, some fender piling was also driven at the ends of the 200 feet extension. The cost of all these works amounts to \$915.68, of which sum \$860.73 was paid previous to June 30, 1899, making the total expenditure up to that date for the 650 feet in length of breakwater built, \$3,366.22. All this length of breakwater has not as yet made any improvement in the depth of water. It has been of much benefit to the locality, shipments being now regularly made from the work by small vessels; it also forms a good shelter and landing for the fishermen who have been frequenting it in large numbers. In order that the depth of water may be improved, a further length of breakwater of at least 400 feet is required.

Total expenditure to 30th June, 1900, \$3,366.31.

#### CAMPBELL'S COVE.

Campbell's Cove, King's County, a small indenture in the coast line on the north side of the island, is situated about 9 miles west from East Point and 14 miles north-east from Souris (the eastern terminus of the Prince Edward Island Railway) and was selected by the Provincial Government in 1872 as the site for the construction of a small isolated breakwater 300 feet long by 30 feet in width, built on the reef that extends from the west end of the cove. Much benefit was derived from the work, both by the fishing and farming industries of the neighbourhood, and a refuge was afforded to fishing boats overtaken by storms.

When repairs to the work became necessary in 1882-83 the department thoroughly effected the same and also connected the breakwater with the shore and constructed an extension of 250 feet, making the work in all 620 feet long, giving a small area of shelter carrying 4 feet at low water spring tides, which rise 4 feet.



## SESSIONAL PAPER No. 19

The repairs and additions made by the department being of a most substantial character, the work, notwithstanding its exposed situation, continued in good condition up to 1888-89, when some slight repairs to the planking and fenders were found to be required. After this date, however, principally due to the weakening of the timber face by the teredo, injury was done by each storm, and although extensive repairs were made in 1891-92, the work suffered severely in the spring and winter of 1893, 90 feet of its outer end being carried away to below low water and the remaining part of the work constructed by the department 154 feet long having either the seaward face carried away or badly damaged.

During 1894-95 all of this damaged portion was reconstructed at a cost of \$1,018.86, the new work on the seaward side being built with a batter of 1 in 12 on the face to the top instead of sloping  $1\frac{1}{2}$  to 1 above low water, thus permitting of better ballasting, and making the work 13 feet wider on top. The portion thus rebuilt is from 6 to 12 feet high and is thoroughly connected with the old work, the whole of the latter being well ballasted and repaired where required, recovered for a further length of 50 feet, and the present outer end bulk-headed to prevent further injury for some time.

No important repair have been made since 1895.

Total expenditure to 30th June 1900 is \$15,789.89.

This work was transferred to control of Department of Marine and Fisheries on 24th August 1888.

## CHAPEL PIER.

Chapel Pier, Kings County, is on the south side of Grand River, about three miles from its entrance into Boughton Bay, and 9 miles from Cardigan Station on the P. E. Island Railway.

The pier constructed by the Local Government previous to Confederation was assumed by the Dominion Government in 1884; it consisted at the time of a shore abutment or approach, 205 ft long with a "block," and "span" at outer end, affording a length of 249 ft of pier 22 ft wide, and extending out to a depth of 7 ft at low, or 12 ft of water at H. W. Spring Tides. When assumed by the Department the sum of \$2,281.38 was paid to the Local Government to recoup it sums expended on its repair between 1873 and the date at which it was taken over, \$50 was also expended on its repair in 1884-85. During 1889-90 a length of 44 ft of pier was added by the reconstruction of a former "Block" and "Span" extending the work out to where a depth of 9 ft of water was carried at low water; general repair of the work was also made at the same time cost in all of which was \$964, owing to the destructive action of the sea worms and other causes such as scour movement of the, ice settlement of the outer work occurred and this with decay of some of the floor stringers and planking of the inner parts of the pier rendering it unfit for traffic urgent repairs had to be made during 1894 and 1897 at a cost respectively of \$145.76 and \$41.46; during the past fiscal year the sum of \$396.27 has also been expended in levelling up the outer blocks, and floor strutting them and the spans also fender piling faces and sides of blocks, replanking outer block and making up the roadway approach with broken stone and gravel.

Total expenditure to 30th June 1900 is \$3,878.87.

This pier was transferred to control of Department of Marine and Fisheries on 25th August 1885.

## CHINA POINT.

China Point Pier, Queen's Co. is situated on the west side of the Orwell River near its entrance into Orwell Bay, was constructed many years ago by the government of the Island to provide a place of shipment for the surplus produce of the

surrounding country, that is both well tilled and very productive as well as thickly settled. The pier is the point of call tri-weekly for the steamer "Jacques Cartier" plying between Charlottetown and other ports on Orwell Bay. As originally constructed the work had a length of 426 feet extending out to the channel where a depth of 15 feet at low water or of 24 feet at high water springs is carried, here a pier-head of 72 ft. long and 25 ft. wide was situated, composed of two blocks of 24 ft. long each, connected with "span" of same length; its inner portion being composed of shore abutment 142 ft. long, and six blocks and intervening "spans," blocks being  $17\frac{1}{2}$  to 22 ft. and the spans from 18 to 32 ft. long, latter being the outer one connecting with the pier-head, all of the spans being floor stringered and planked over while the remainder of its roadway, after the work was filled with poles and brush, had top formed of clay and gravel.

The pier is one of the P. E. Island Piers control of which was assumed by the Dominion Government in 1883-84 when payment was made of \$3,436.47 to the Local Government to recoup it for sums expended on repairs and maintenance between that date and 1873 when the Island entered Confederation of the Provinces. Owing to the soft and yielding nature of the bottom on which the pier-head rested, destructive action of the "teredo" and the long span connecting it with the approach (the pier also when assumed by the Dept. being very old and almost a complete wreck) it was found almost each year necessary to make some expenditure to keep it passable for traffic, the native and unprotected timber used in its construction and the fender piling which for years was its principal support being about destroyed in from 2 to 5 years, the sum of \$2,221.82 was expended on repairs between 1884 and 1897.

With the sum of \$500.00 authorized for expenditure in 1897 it had been intended, in connection with other required repairs to have driven a number of creosoted piles along the faces of the blocks forming the pier head, and these had been provided, but before the work could be done movement of the ice during a high spring tide about the middle of March carried away the top portion of one of the blocks, and broke down the connecting spans making repair of the work then impossible with the sum available, on account of which all of the unmaterials of value were collected from the damaged work, and these, with the creosoted timber provided, placed in safety, and so kept up to the 10th Feb. 1898 when on the letting of contract for reconstruction of new pier-head, etc., they became the property of the contractor for use in the work, which was commenced 19th July and satisfactorily completed 31st October 1899. The work done consists of a new pier-head 70 feet long by 35 ft. wide, measured on top, placed at 20 feet distant from existing work, to which it is connected by a span of that length, outer block of existing work was close piled on outer face and ends, as also newly floor stringered and planked over, latter being done to the adjoining span and block, besides general repair being made to all of the remainder of the roadway placing the pier in good and serviceable condition, the cost of which including inspection was \$2,207.00.

The new pier head up to two feet above low water is made of close laid poles, brush, and stone, former being laid lengthwise and crosswise in alternate layers, each course of poles being made fast by spikes to the lower one, two feet above low water the work is of close faced timber full ballasted, floor stringered, planked over and fender piled at 10 ft. centres with creosoted timber and additionally piled at 5 ft. centres with native timber.

Total expenditure to 30th June 1900 is \$7,865.30.

This pier was transferred to control of Department of Marine & Fisheries on 24th August 1888.

#### CLIFTON.

Clifton Pier, Queens Co. is on the south side of the South West River about  $2\frac{1}{2}$  miles from its entrance into New London Harbour and immediately below the public road bridge here crossing the river, it has a width of from 18 to 20 feet for



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a distance of 202 feet the remaining 58 feet pier head being 25 feet wide. It is built of alternate blocks of timber and what had originally been "spans" or openings, but now filled in with poles, stone and brush out to the outer block, the roadway out to which being formed of clay put in on top of brush, poles and broken stone. The pier-head which extends out to the edge of the channel, where a depth of 14 feet at low water or 18 feet at high water is carried, affording good shipping facilities for the class of vessels entering New London Harbour, is a close faced solid timber work, filled in with brush and stone, and is floor stringered and planked over.

The work is also one of the P. E. Island Piers, control of which was assumed by the Dominion Government in 1883-84, when the sum of \$208.00 was recouped the local Government for the monies that had been expended upon it between 1873 and 1884 on repairs; since then up to the close of fiscal year 1898-99 the sum of \$870.30 has been expended by the Dept. on repairs, while during the past year \$292.88 was spent on the levelling up, repairing, and fender piling of the pier head.

Total expenditure to 30th June 1900 \$1,371.18.

This work was transferred to control of Department of Marine & Fisheries on 25th. August 1885.

## CRANBERRY WHARF.

Cranberry Wharf, Queen's County, is situated on the Hillsborough River, is 275 feet in length, 21 to 24 in width and 20 feet high at the outer end.

This wharf was purchased from the Provincial Government in 1898 for the sum of \$2,075.35.

Total expenditure to 30th June, 1900, is \$2,075.35.

## GEORGETOWN.

Georgetown, King's county, the terminus of the Georgetown branch of the Prince Edward Island Railway, and shiretown of King's county, is situated on the western side of the Montague River, near its entrance into Cardigan Bay.

Georgetown harbour, is well and favourably known as being one of the best and safest on the island, and is also the port of call for the steamer *Stanley*, plying between Picton and the island during the winter months. Before the construction of the Prince Edward Island Railway, a large shipping business was done from this port, for the accommodation of which the local government many years before confederation constructed, at the place, the wharf since known, as the "Queen's Pier." This pier is centrally situated on the harbour front, and has a length in all of 640 feet, and a width of from 30 to 36 feet; along the end and outer 300 feet of the sides, a depth of 12 feet obtains at low water or of 17 feet at high water springs, as these rise here about 5 feet. The shore end of the work for 340 feet in length is of close-faced timber work filled with brush, stone and clay; the latter being used to form the roadway on top while the outer length is composed of six 'blocks' and six 'spans,' with a planked road way supported by stringers laid across the whole.

The Dominion government assumed control of the pier in 1884, paying at the same time to the local government a sum of \$2,254.24 to recoup amounts expended by them from 1873 to 1884. This pier being at the time of the transfer a very old structure and very much out of repair, an expenditure of \$1,000 was at once required to put it in even a passable state, and nearly every year since small outlays had to be made for renewals and repairs. At the close of the fiscal year 1897-8 the total expenditure incurred for repairs and renewals amounted to \$2,292.68, making, with the sum recouped the local government, a total outlay of \$4,546.92.

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During the year 1898-9 the sum of \$399.92 was applied in reconstructing the top portion of the whole of the seaward side of the shore abutment or approach, putting in new mooring posts, floor stringers and planking, as required on outer portion, and making up the roadway with broken stone. The plank sidewalk and hand railing on inner side was also repaired.

Total expenditure to 30th June, 1900, \$5,324.90.

This wharf was transferred to control of Department of Marine and Fisheries on 24th August, 1888.

#### HAGGARTY'S WHARF.

Haggarty's Wharf, Queen's County, is situated on the south eastern side of the Hillsborough River, about 12 miles from Charlottetown.

The wharf consists of a shore abutment or approach 372 feet long and 20 ft. wide formed of brush, and poles, clay filled on top, and a pier-head made up of two blocks with intervening spans in all 91 feet long and 31 feet wide at the outer end which extends out to a depth of 8 feet at low water, the wharf was constructed many years ago by the Government of Prince Edward Island, and remained under its control until 1898 when it was assumed by the Dominion Government who made payment of \$5,750.00 to the Local Government for the sums it had expended on maintenance of the work between that date and 1873. when the Island entered Confederation, during 1898 the sum of \$134.10 was also expended by the Department on repair.

Total expenditure to 30th June, 1900, \$5,969.10.

#### HICKEY'S PIER.

Hickey's Pier, Queen's County, is situated on the southern shore of the Hillsborough or East River about 10 miles from Charlottetown; it was constructed by the local government many years previous to Confederation, and is 428 feet in length and from 22 to 28 feet in width. The work of the latter width extends inward from the outer end for a distance of 180 feet and forms the chief loading place for vessels. Some dredging was done in 1880-1-2 along this portion of the pier and a depth of about 10 feet at low water secured at a cost of \$782.19. The Dominion Government assumed control of this pier in 1884, at which time they repaid the local government the sum of \$1,255.27, which they had expended on it for repairs between that date and 1873. The work was, however, at the time in a dilapidated condition and expenditures had to be made nearly every year since to keep the pier in a passable state for traffic. The total expenditure incurred for repairs up to the close of the fiscal year 1897-8 amounts to \$2,928.61, and by adding the sum recouped to the local government and the cost of the dredging done in 1880-1-2 the total cost of the pier to the department up to June 30, 1898, is found to be \$4,966.07.

Total expenditure to 30th June, 1900, \$5,941.66.

This pier was transferred to control of Department of Marine and Fisheries on 24th August, 1888.

#### HIGGIN'S SHORE.

Higgin's Shore Pier, Prince County, is situated on Egmont Bay, about 10 miles north from Cape Egmont, and about 6 miles west from Richmond Station on the line of the Prince Edward Island railway. It has a width of 20 feet 6 inches, and is 453 feet long, extending out to a depth of about two feet at low water spring tides and giving at high water a depth of seven feet: spring tides here rising five feet. The pier, which was constructed many years ago by the local government, has solid closed faced timbers on sides and outer end, securely

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tied together by cross ties placed at 10 feet centres, and central timbers in each course extending over the whole length; the entire body of the work is filled with brush and stone, with clay on top to form roadway. During 1898 the sum of \$400.02 was expended in raising the outer 150 feet of the pier two feet in height, some new face timbers, guard timbers, cross ties and fenders were also put on this length, and the entire length of the roadway was made up with broken stones and gravel filling. The work, which had become impassable, is now in good condition for traffic.

Total expenditure for 30th June, 1900, \$3,634.83.

This work was transferred to control of Department of Marine and Fisheries, on 24th August, 1888.

## HURD'S POINT.

Hurd's Point Pier, Prince County, is situated on the southern side of Bedeque or Summerside Harbour, and about 3 miles south of Summerside, the shire town of the county.

The pier is a most important shipping place, being about the only outlet for the surplus produce of a large and rich agricultural district. It is also the calling place for the ferry steamer plying in the harbour and which makes several trips daily between Summerside and the pier. It is 510 feet in length and 26 feet in width, excepting the outer 50 feet where the width is 65 feet. During the year 1896 the sum of \$107.62 was expended on general repairs, consisting in replacing 6 fender piles, 3 mooring posts, all decayed or broken, planking, levelling up floor stringers in the spans, and making up the roadway approach with gravel.

Considerable dredging was done in 1899.

Total expenditure to 30th of June, 1900, including dredging, \$15,734.85.

This work was transferred to control of Department of Marine and Fisheries, on 24th August, 1888.

## KIER'S SHORE.

Kier's Shore Pier, Prince County, is situated on the east side of Richmond Bay, about 7 miles from Kensington, a village and station on the line of the Prince Edward Island Railway. The pier originally constructed jointly by the local government and residents of the district, has a length of 1,033 feet and a width of 20 to 25 feet, excepting for the outer 50 feet where it is 40 feet wide, with the exception of a short span (17½ feet) at 283 feet from the outer end. All the work is constructed of close-faced timber work, filled with brush and stone, with roadway of clay or gravel, excepting an outer 50 feet or pier head which is floor stringered and planked over.

During the spring of 1897, the sum of \$62.05 was expended in filling in with broken stone and gravel at all places where a settlement had occurred in the roadway or where it was cut up by the heavy traffic.

Total expenditure to 30th June 1900 is \$9,425.35.

This work was transferred to control of Department of Marine and Fisheries on 24th August, 1888.

## LAMBERT'S PIER (MONTAGUE).

Lambert's Pier, King's County, is situated on the southern side of the Montague River, immediately below the highway bridge at the village of Montague, and is six miles from the entrance of the river into Cardigan Bay. It has in all a frontage of 310 feet on the river channel, and consists of two sections, the upper or western one 140 feet long and 24 feet wide constructed of cribwork on the inner side and pile work outside, and the eastern section 170 feet long, 25 feet wide formed entirely of pile bents capped, floor stringered, and planked over; the

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inner side of the western section, as well as a part of the eastern, being made up of ballast discharged from vessels, and connects with the bank of the river, forming a good approach to the pier.

Total expenditure to 30th June 1900 is \$3,212.66.

This work was transferred to control of Department of Marine and Fisheries on 24th August 1888.

#### LEWIS POINT (CARDIGAN).

Lewis Point Pier, King's county, is situated on the north side of Cardigan River, a short distance below Cardigan Bridge (the head of navigation) and about eight miles from its entrance into Cardigan Bay. The pier is 575 feet long, being composed of a shore abutment of 365 feet in length, two intermediate blocks each 35 feet long and an outer block 79 feet in length with intervening spans, each about 20 feet wide, out to the outer block which is 33 feet wide. At the outer end and sides of the outer block there is now a depth of 12 feet at low water or 17 feet at high water springs, the approach from the channel to the pier and the berths at it having been improved by dredging in 1894-95. During the year the whole of the top portion of the pier, including span beams, covering, &c., have been renewed, and the faces of the head block fenderpiled at four foot centres with hard wood spars, and the roadway of approach was made up where required with broken stone and gravel, the whole pier being thus placed in a good and serviceable condition at an expense of \$1,000.24.

Total expenditure to 30th June, 1900, \$4,223.52.

This work was transferred to control of Department of Marine and Fisheries on 24th August, 1888.

#### MALPEQUE.

Malpeque Breakwater, Prince County, lies within the eastern or principal entrance of Richmoud Bay, on the north shore of the Island, about 90 miles from East Point, and 40 miles from North Cape.

During 1877-78-79, a breakwater 600 feet in length was constructed by the department, on the western end of "Royalty Sands," on the eastern side of the harbour, to shelter the anchorage from north-east winds and afford a shipping place for the produce of the surrounding country.

Since the construction of the breakwater, the sands inside began to waste away by the action of the sea during easterly storms, and to prevent this action, a breastwork was constructed from the inner end of the breakwater to Royalty Point, a distance of 2,370 feet.

The sum of \$350 was expended during 1891-92, in reconstructing the top portion of the outer 400 feet of breakwater, which was carried away in the fall of 1890.

During the fiscal year 1893 the sum of \$200 was expended in repairing and strengthening the outer 500 feet of the breastwork through which, it was feared, a breach might be made.

No important repairs were made since 1893.

Total expenditure to 30th June 1900, \$20,969.31.

#### MC'GEES (EGMONT BAY)

Mc'Gees Pier, Prince County, is situated on the east side of Egmont Bay about 5 miles north from Cape Egmont and 6 miles from "Wellington Station" on the line of the Prince Edward Island Railway. Originally constructed by the local government to afford shipping facilities for the district, its control was assumed in 1883 by the department, and in 1884 small repairs were made to make it available for traffic.

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At the beginning of the fiscal year 1895-96, the pier had become quite unserviceable, some 50 feet of its outer end having been carried away by the ice in 1892, besides which all of the roadway was impassable owing to washout and settlement, the floor stringers and covering of the 30 feet span (at about centre of pier) were decayed and broken, while on a length of the pier inward to shore 290 feet, two to four feet in height of the top face timbers required renewal.

During the fiscal year 1896 the damaged portion was reconstructed and repaired, and the pier put in good condition at a cost of \$1,395.19. The work done consisted in the entire rebuilding of the outer 50 feet, and the repair and reconstruction of all of the remaining length (in all 700 feet long and 20 feet wide) the former span or opening 30 x 20 x 12 being solidly filled in, and the outer end of the pier where exposed to the action of the ice protected with fender piling of hardwood.

No important repairs were made to this work since 1896. Total expenditure to 30th June 1900, \$4,216.44.

This work was transferred to control of Department of Marine and Fisheries on 24th August, 1888.

## MINK RIVER (BASIN PIER)

Mink River Pier, King's County, also known as 'Murray Harbour North,' is situated on the north-east side and near the mouth of Mink River, where it enters the southern side of Murray Harbour.

The pier is 400 feet long, consisting of a shore abutment or approach of 200 feet, 'blocks' and 'spans' 20 feet wide for 130 feet, and a pier head 70 feet long by 32 feet wide; all the cribwork is constructed of close-faced timber. At the end and sides of the pier head there is a depth of 6 feet at low water or 12 feet at high water spring tides, which here rise 6 feet. This pier is one of the many works originally constructed by the local government, the control of which was assumed by the Dominion Government in 1884, when a sum of \$293.25 was paid the local government to recoup sums expended by them between 1873 and 1884. Thence up to the end of the fiscal year 1897-8, expenditures for repairs amounting to \$1 505.65 were found necessary to keep the work in a passable state for traffic; its cost to the department up to June 30, 1898, was therefore \$1,798.90. During the year 1898-9 the sum of \$500.10 was applied in close piling the outer blocks with hardwood, putting in new span beams, guard timbers and mooring posts and effecting minor general repairs required to place the pier, for a time, in good and serviceable condition.

Total expenditure to 30th June, 1900, \$2,299.00.

This work was transferred to control of Department of Marine & Fisheries on 24th August, 1888.

## MIMINIGASH HARBOUR

Miminigash Harbour, Prince county, is situated on the north-west coast of the Island, about 15 miles from "north cape" and 18 miles from "west point." Before its improvement by the Department, it was one of the numerous ponds along this coast emptying into the Strait of Northumberland, the channels or outlets of which as they passed through sandy beaches were constantly changing as also at times when severe storms occurred on the coast completely blocked up, as the site however was sheltered to a great extent by "Miminigash Reef," a ledge of rock nearly a mile long, which lies parallel with the shore at about half a mile distant it had much advantage over the other ponds and was the one generally used by the fishermen during stormy weather, and after examination of it and the other ponds on the coast proposed as sites for formation of a harbour, the one selected by the Department, work being commenced at the place in 1878, and

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this, at the close of 1897-98, consisted of piers or breakwaters on either side of the outlet (position of which was made permanent) and confining its width to 56 feet, the breakwater, on the north side, having a length of 535 feet, and on the south side of 350 feet, there being also inward of the latter a beach protection 270 feet long to guard against scour, and formation of a new channel or outlet back of the southern work, the cost of all of which, up to the close of fiscal year 1897-98 being \$14,376.56. During 1898-99 as much of the works had become greatly weakened by age, and action of the ice and the "toredo," their general repair to an extent was effected, this consisting of close piling portions of channel face, reballasting of outer 300 feet of northern work, new floor stringering and covering, in part, being put in, and ballasting and close piling both sides and end of the southern work, redriving piling with addition of braces and fender piles at 5 feet centres on beach protection on southern side as also strengthening that on the north side by occasional piling, the expenditure in connection with which amounting to \$1998.87, which included the payment of a number of piles that were not driven at the time. Contract was entered into Jan. 11th 1899 for the construction of a new block 60 feet long by 30 feet wide at the outer end of the northern breakwater, the work being commenced on March 21st 1899, and the work completed August 11th of that year at a cost of \$2,526.00 including payment of inspection.

During the past fiscal year the repairs commenced the previous season for renewal and strengthening of the work were also continued, the sum of \$997.83 being expended; the work done consisting in filling in with new cribwork, packed with brush, and ballast in alternate layers on 150 feet of the inner part of south breakwater, on channel face of which additional fender piles were driven at 5 feet centres, as also where close piling had been carried away or damaged were replaced; similar work was done also on the northern beach protection for a length of 200 feet, while addition of 100 feet was built, floor stringers and planking being put on the outer 150 feet in front of the fishing stages, some repair was put on the outer end of original north work, and brush hurdles set up extending in an easterly direction at about high water for about 200 feet, so as to both accumulate sand and prevent it being carried into the "Run."

Total expenditure to 30th June 1900, \$19,899.30.

#### MURRAY HARBOUR (SOUTH RIVER.)

Murray Harbour South Pier, King's County, is situated at the head of navigation immediately below the public road bridge on the South River and about nine miles inward from the entrance of Murray Harbour. It extends out from the north bank of the river which is about 300 feet wide at this point, to the edge of the channel where a depth of 10 feet of water is carried at low spring tides, giving with the rise of  $5\frac{1}{2}$  at high water springs a good approach for the largest sized vessels usually visiting the harbour. The pier consists of an approach 89 feet long and an L or pier head having a length of 107 feet 6 inches on the channel face. Both approach and pier head are formed of timber "blocks" with intervening "spans" all of which, except at the shore end are floor stringered and planked over. The "blocks" above low water are of square timber close faced, but below low water are of round timber open cribwork, while the shore end of the approach is constructed of poles, brush and stone, covered on top with gravel.

Owing to the natural decay of the top portion of the pier and injury done by the teredo and ice to its bottom portion, it had latterly become unserviceable and quite unsafe for traffic, there being great danger of the outer blocks forming the pier head, falling into the channel. This was remedied during the year 1896 by the entire reconstruction of its top portion, the different blocks being rebuilt or levelled up as required from 3 to 6 feet, new floor stringers, covering,

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guard timbers and mooring posts put in, and the channel face of the blocks forming the pier head close piled, while fender piles were driven on their inner sides and ends, thus placing the work in good and safe condition at a cost of \$1,011.34.

No important repairs have been made since 1896.

Total expenditure to 30th June, 1900, including dredging, \$18,044.13.

This work was transferred to control of Department of Marine & Fisheries on 24th August, 1888.

## NEW LONDON HARBOUR.

New London Harbour, Queens Co., is on the northern coast of the Island about 10 miles south east of the entrance into Richmond Bay, within its entrance, which has a width of about 1200 feet, the harbour is about 3 miles long and nearly as wide, and receives the waters of the "Southwest," the "Stanley" the "French" and the "Hope" Rivers, these all navigable for at least short distances, and having at them wharfs or shipping places at which is exported the surplus produce raised in the surrounding districts, all of which are both thickly settled and land well cultivated and productive, quantities of general merchandise, coal, lumber, limestone, etc., being also imported by water; New London not having (as is the case generally on many other parts of the Island) convenient railway facilities, the harbour is also largely used as a fishing station and harbour of refuge for both of which it is most convenient for the fishermen being near some of the best fishing grounds on Gulf of St. Lawrence.

For improvement of its entrance which is obstructed by a shifting sand bar works were commenced by the Department in 1878, these now consisting of beach protection and breakwaters on each side of the entrance, the work on the eastern side having now a length of 1120 feet and that on the western side of 460 feet, their purpose being to preserve and extend the sand beaches and so by confining the current cause increased scour and improve the water over the bar, which result has been obtained to a most satisfactory extent proportional with the expenditure as made, the depth of the water being improved at such times as the work, have been in good order, fully 6 feet giving at low water 12 feet over the bar and rendering New London Harbour one of the best on the north coast of the Island. The works are built partly of stone, brush and piling and in part of cribwork, but in each case the outer or finishing block is of close faced solid timber work.

Since construction the western work has received no damage requiring repair, the eastern one however being exposed to a strong current, action of running ice, and at times to a very heavy sea has quite often suffered damage requiring some yearly expenditure to keep it in repair, and making the cost of the works to the Department up to the close of the fiscal year 1898-99 to be \$21,481.99. During the past season the sum of \$236.14 was expended in reconstructing a 40 feet length of work and repairing the adjoining 50 feet as well as replacing fenders and sheating an outer end of the breakwater.

Total expenditure to 30th June 1900 \$21,718.13.

## NINE MILE CREEK.

Is situated in Queen's County, about 5 miles west from the entrance into Charlottetown harbour, on the shallow inlet entering into the passage between St. Peter's Island and the mainland. The pier constructed many years ago by the local government to provide a shipping place for the district, has a total length on the centre line of 290 feet with an average width of 20 feet, composed of a shore approach or abutment and several "blocks and spans." The end which originally extended to the line of low water mark, has had a channel carrying 7 feet of water at low spring tides dredged to it by the department at a

cost of \$6,286.46, thus admitting of the approach of good sized schooners at high water spring tides, which rise 8½ feet. The pier, however, being in bad condition generally and requiring repair over its entire length, as well as being too narrow at its end for the accommodation of vessels, turning of teams, space required for shipments, etc., a contract was entered into on the 22nd August 1892, for the construction of a new block 35 feet in length and 20 feet wide at the outer end and the same was satisfactorily completed in February, 1893.

During the fiscal year 1895 the older portion of the pier was thoroughly repaired at a cost of \$884.00, the entire top having been rebuilt, its sides and ends refendered and the "spans" or spaces between the blocks filled with poles and crib-work.

Repairs amounting to \$83.50 were made in 1896.

Total expenditure to 30th June, 1900, \$2,183.55.

This work was transferred to control of Department of Marine & Fisheries on 24th August, 1888.

#### NEWPORT OR NORTH CARDIGAN PIER

North Cardigan Pier, Kings County, is situated on the north side of the Cardigan River about 5 miles from Cardigan Bridge, and station on line of the P. E. Island Railway, and is one of the P. E. Island Piers control of which was assumed by the Dominion Government in 1884-85 when sum of \$2,732.70 was paid the Local Government to recoup it for monies expended on maintenance of the work between 1873 date at which the Island entered Confederation and the time when its charge was taken by the Department.

The pier has a length of 381 feet consisting of shore abutment 100 feet long and seven blocks with intervening spans; it is from 23 to 25 feet wide to the outer block or pier head, which has a width of 32 feet; the blocks are from 19 to 25 feet long while the spans vary from 14 to 26 feet. The approach and all of the blocks are constructed of close faced timber work filled with brush, stone and gravel, the latter forming the roadway, with the exception of the two outer blocks which are floor stringered and planked over. Being an old structure much out of repair when assumed by the Department it has required almost yearly some small expenditure to keep it in passable state for traffic, these sums in all amounting now to \$1,502.87 the amount of \$308.61 having been spent last season in repair and renewal of planking, floor stringers, putting in new fenders, etc.

Total expenditure to 30th June 1900 on pier \$4,235.57 and dredging \$7,692.21 or \$11,927.78.

This pier was transferred to control of Department of Marine & Fisheries on 24th May 1888.

#### PINETTE.

Pinette Pier, Queen's County, is situated on the south side of the Pinette River immediately below and at right angles to the public road bridge crossing the river, being connected with the bridge by a "span" 28 feet in length. The pier is 120 feet long, by 28 feet wide and constructed of close faced square timber, cribwork, ballasted, floor stringered, and planked over. It faces on the river channel where a depth of 8 feet of water is available at low water, this having been obtained by the dredging done by the department in 1881, since which no shoaling of any account has taken place. The pier being a very old structure and much out of repair when assumed by the department in 1883, general repairs had several times to be carried out on it since then in order to keep it open for traffic. Settlement having occurred in the cribwork after the dredging was done, the pier had to be levelled up; moreover, additional floor stringers, &c., had to be put in shortly after the general levelling up was completed.

During the year 1896 the sum of \$200 was expended on work of this



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nature so as to render the pier serviceable for traffic, 7 cross ties, 5 floor stringers each about 22 feet long, two span beams on the approach from the bridge, 8 new fenders, 2 mooring posts and about 2,000 feet B.M. plank covering were put in; two bearing piles were also driven and placed under the centre of the new span beams and 120 lineal feet of new guard timber laid.

Total expenditure to 30th June, 1900, \$3,226.68.

This pier was transferred to control of Department of Marine & Fisheries on 24th August, 1888.

## PORT SELKIRK.

Port Selkirk Pier, Queen's County, is situated on the south side of Orwell River near its entrance into Orwell Bay, and is distant by water about 20 miles from Charlottetown.

The pier is in the form of a **T** consisting of a pier head 250 feet long and 35 feet in width, fronting on the edge of the channel, connected to the shore by an approach 250 feet long and 23 feet wide. The whole pier head and the outer part of the approach are composed of a series of "blocks" and "spans," floor stringered and planked over. During the year 1896 the sum of \$597.46 was expended in levelling upper or northern "block" and adjoining "span;" fender piling the face and sides of this block with creosoted piling; putting in new floor stringers and covering; fender piling the whole of the remainder of the pier head with native timber; rebuilding a length of 80 feet of timber facing on the upper side of the approach and making up the roadway with gravel and broken stone; the entire pier being thus placed in good condition.

Total expenditure to 30th June, 1900, \$9,845.11.

This work was transferred to control of Department of Marine & Fisheries on 24th August, 1888.

## POWNAI.

Pownal Pier, Queen's County, is situated at the head of the north-eastern portion of Hillsborough Bay, about 9 miles east of Charlottetown.

The pier as built by the local government many years previous of Confederation, is in all 753 feet long; consisting of a shore abutment 209 feet in length and 16 feet wide and 14 "blocks" with intervening "spans"; the inner blocks are from 14 to 16 feet wide, while the outer ones forming the pier head are 40 feet wide. Originally there was little or no water at the pier when the tide was low, but in 1880-81, in order to afford to large boats and small vessels access at all times of tide, and to permit of large vessels loading when the tide is well up, the department dredged a channel from the deeper water outside, 1,275 feet in length, 50 feet in width, and of a minimum depth of 6 feet at low water, and also formed a basin 250 feet long and 90 feet in width on the eastern side of the outer end of the pier.

During the year 1896 the sum of \$132.47 was expended in renewing portions of the planking and floor stringers of the outer "blocks" and "spans," putting on four new fender piles and making up roadway with clay and gravel, thus placing the pier in serviceable condition for fall and spring shipments.

Total expenditure to 30th June, 1900, \$2,528.35 including \$354.66 for dredging.

This work was transferred to control of Department of Marine & Fisheries on 24th August, 1888.

## RED POINT.

Red Point Pier, Queen's County, is situated on the eastern side of the Hillsborough or East River, about 7 miles north-easterly from Charlottetown. The

pier which was constructed by the local government many years before Confederation, has a length of 650 feet, averaging 21 feet in width, and is composed of a shore abutment 310 feet long and five separate 'blocks' from 29 to 75 feet in length, with intervening 'spans' of 21 to 25 feet in width. The whole of the cribwork is of close-faced solid timber, the shore and inner blocks being filled with brush and stone, with some clay on top to form the roadway, while floor stringers are placed on the outer blocks and spans and planked over. This pier is an important shipping point spring and fall for a large section of a thickly-settled and well-tilled district. Until 1897-8 it remained the property of the local government, to whom the sum of \$4,033.31 was paid in the said year by the Dominion to recoup them for moneys expended on it for repairs, etc. Previous to the transfer being made, the department had expended in 1884-5-6-7-90-1 a sum of \$1,500.66, \$600 being chargeable to 'Construction and Improvements,' and \$900.66 to 'Repairs.' Again in 1888-9 and 1890, a sum of \$1,749.41 was laid out by the Dominion for dredging a channel 12 feet deep at low water, from the deep water in the river to the outer end of the pier and along the sides of its outer blocks, which previously only reached low water mark.

During the year 1898-9, the sum of \$985.83 was expended in levelling up and closely fender-piling the outer blocks.

Total expenditure to 30th June 1900, \$4,033.31.

#### ROCKY POINT.

Rocky Point (so called) Prince Co., is situated on the east side of Egmont Bay, 8 miles north of Cape Egmont and about same distance from Richmond station on line of the P. E. Island Railway. For many years it has been the site of fishing station and several lobster factories, and to within some short time had at its protection of a small breakwater or block that had been erected by residents of the locality; this, however, being of too slight construction, was some time ago destroyed, rendering it necessary for the fishermen each evening to haul up their boats, as also causing them much trouble when landing their catch of fish. To obviate which difficulty the department have, during the past fiscal year, had constructed at the place a cribwork 200 feet in length, that extends out to about low water. The outer 100 feet of this, on its west or exposed side (for its protection from running ice) is formed with sloping face 1 to 1 and is sheathed with planking; all of the work, that has a width of 20 feet on finished top, is full ballasted, floor-stringered, and is planked over and has sides fender piled at 10 feet centres. Its cost was in all \$1,447.43.

Total expenditure to 30th June, 1900, \$1,447.43.

#### RUSTICO.

Grand or North Rustico Harbour, Queen's county, the most important fishing station, on the northern coast of the Island, is situated about midway between "East Point" and "North Cape." During 1881-2-3-4, a breakwater or wing dam 1,240 feet long was built on the northern side of the harbour, and a similar work 450 feet long on the southern side of its entrance, for the purpose of concentrating the current at ebb tide and directing it upon an outer obstructing bar, to improve by scouring the depth of water. The desired result has in a measure been induced and some 2 or 3 feet better water are now carried over the bar, giving at low water 8 to 9 feet, or at high water springs a depth of from 11 to 12 feet, which no doubt would be further improved by the extension and maintenance of the said works.

The breakwater on the northern side, is in a way, the most important work of the two, as it protects an inner low beach on which most of the fishing stages and fish houses have been erected. As already stated, it was originally 1,240 feet

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long, but, chiefly on account of the timbers being much weakened by the action of the teredo, suffered severely during various storms; 120 feet being carried away and 150 feet seriously damaged. In 1893-4-5-6 extensive works of restoration and repair were carried out, a head block 30 feet by 60 feet being added and the outer 140 feet widened and otherwise strengthened and secured; the total length of the breakwater was thus reduced to 1,119 feet.

The total expenditure incurred by the Dominion in connection with the maintenance and improvement of North Rustico harbour up to the close of the fiscal year 1897-8 amounts to \$41,856.95; of this sum, \$21,362.40 may be charged to "Construction and Improvements" \$5,465.59 to "Repairs" and \$15,028.96 to "Dredging."

During the year 1898-9 the sum of \$182.55 was applied in placing a series of "brush hurdles" on a space varying from 200 feet to 600 feet in width, at a point about 1,000 feet from the western end of Robinson's Island in Rustico harbour, where, by the action of the sea the sand hills had been carried away and the formation of a new or additional channel into the harbour appeared imminent, to the detriment of the latter.

The work done gave most satisfactory results, causing the making of new beach from 3 to 5 feet in height for a width of 200 feet, and preventing damage by storms during the spring of 1899 that would no doubt have been done to Rustico harbour, had no precautionary measures been taken in due time.

Total expenditure to 30th June 1900, including dredging, \$42,039.50.

## ST. MARY'S BAY.

Saint Mary's Bay Pier, King's county, is situated on the southern side of St. Mary's, which is inside Pannure Island, so called although not properly an island as a long gravel beach connects it with the mainland. The pier was constructed originally by the local government, and is one of those assumed by the Dominion in 1884; it is 407 feet in length; for a distance of 310 feet is 21 feet in width, the outer 97 feet are from 28 to 29 feet in width. The work comprises a shore abutment or approach and seven 'blocks' with intervening 'spans'; but four of these spans were many years ago filled with poles, brush and stone and the roadway out to the pier-head by clay and gravel filling on top.

Since the pier was taken over by the Dominion Government, the approach thereto has been much improved; the outer blocks being levelled up, close-piled &c. In 1892-93 a channel carrying 10 feet at low water was dredged to it with a basin at the end, and loading berths on the sides of the pier 50 feet wide and 100 feet long—the whole at a cost of \$4,530.51.

The total expenditure incurred by the Dominion up to June 30, 1898, for works carried out in connection with the St. Mary's Bay pier, amounts to \$7,368.88, of this amount \$1,336.59 was recouped to the local government for their outlay on the pier from 1873 to 1884, \$1,501.78 applied in making repairs and the balance used for dredging purposes.

During the year 1898-99 a sum of \$435.17 was applied in filling in two of the outer spans, rebuilding a portion of the inner part of the approach, putting in new floor stringers and planking on the outer span; replacing fenders, guard timbers, &c., and making up the whole of the roadway with broken stone and gravel.

Total expenditure to 30th June, 1900, including dredging, \$9,003.89.

This work was transferred to control of Department of Marine and Fisheries on 24th August, 1888.

## ST. PETERS BAY BREAKWATER.

St. Peters Bay Breakwater, Kings Co., is situated on the north coast of the Island about 35 miles west from East Point, and on the west side of entrance into

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St. Peters Bay and was constructed by the Department in 1878 to improve the entrance and afford better shelter for the fishermen. it has a length of 226 feet built of close faced solid timber work full ballasted, floor stringered and planked over, and has its inner end connected with the high ground or sandhills by a breast work or beach protection 1420 feet long to prevent a channel being formed through the beach on its inner side. After the construction of the western breakwater, it was proposed to further contract the width of the entrance, thus by increasing the current improve the depth of the water over the bar; to accomplish this a contract was let in 1883 for the construction of a breakwater 1900 feet long on the eastern side of harbour's mouth, but the contractor abandoned the work after being paid \$1,813.92 and when less than one half of it had been built and little now remains of this work, it being destroyed by storms and by being buried in the sands, but for all it has been beneficial by preventing the sea washing over the point and the water of channel over the bar being improved. The cost of the western works, including repair at different times has been \$9,066.45 up to end of fiscal year 1898-99 or with added sum of \$1,819.32 paid for the work on the eastern side, a total of \$10,885.77 expended at the place. During the past season the further sum of \$503.56 was spent on putting in a close piling on outer end and seaward side of the western work, and making up with brush and stone parts of beach protection, while the corners on the outer end were covered for a length of 6 feet with iron plate for protection from action of the running ice in spring and fall.

Total expenditure to 30th June, 1900, \$13,203.25.

#### SOURIS HARBOUR.

Souris Harbour, King's County, is situated on the southern side of the Island, about 16 miles westward of East Point, and is most important both as a place of shipment and harbour of refuge, being largely used during season of navigation by coasters and fishermen, the works constructed by the Department affording good accommodation and a perfectly sheltered area carrying from 12 to 20 feet at low water, sufficient for a large fleet of vessels. Souris, is also the eastern terminus of the Prince Edward Island Railway, which has at the harbour a deep water wharf from which shipments can be made later in the fall and earlier in the spring than from any of the other Island harbours. The breakwater that was commenced by the Department in 1877, has now a length of 1250 feet, 270 ft. of which was constructed by the Local Government previous to Confederation, all of it, as when severe storms occur from the southward and generally to more or less action of the ice in the winter time, it has since its construction required extensive repairs, portions of it at times being completely carried away and having to be rebuilt, this owing greatly to the action of the "toredo" and poor description of stone at first used in its ballasting, native timber being either destroyed or so greatly weakened in a few years by the former, and the stone becoming reduced to sand, for a great part rendered it unfit to withstand the forces to which it was exposed, both of which defects in construction, so far as possible latterly, are being guarded against, creosoted timber being used for the outer block last constructed, while the ballast is imported stone of durable nature and description. During the past season, work in connection with the contract entered into 16th August, 1898, for the rebuilding and repairing of the inner end of the breakwater and formation of protection slope on its seaward side was continued, and the work accepted 5th May, 1900. The cost of the work done on this contract including inspection, was \$9,330.00.

Total expenditure to 30th June, 1900, \$198,818.73.

This work was transferred to control of Department of Marine and Fisheries on 19th February, 1884.

## SOUTH RUSTICO.

South Rustico Pier, Queen's county, is situated immediately below the Oyster Bed Bridge, at the mouth of the Wheatley River, which enters Rustico Bay at its southern end. It is distant about six miles from Hunter River Station, on the Prince Edward Island Railway, and about thirteen miles to the northward of the city of Charlottetown.

The pier was constructed by the Local Government, to accommodate the shipping of produce from and the importation of coal and lumber to the locality. It is 593 feet in length and consists of a shore abutment 450 feet long and 17½ feet wide, and of three detached blocks about 25 feet apart. The inner block is 17 feet wide and 23½ feet long, the two outer blocks are respectively 29 and 30 feet wide and 20 and 24 feet in length. The approach or shore abutment and the blocks are built of square timber, filled in with brush, stone and clay. The outer block and the spans are covered with plank.

During the storm of the 1st December 1890, the top of the outer block was badly damaged and the span connecting it with the inshore portion also suffered, but with an expenditure of \$120, the pier was placed in a serviceable condition.

No important repairs were made since 1892.

Total expenditure to 30th June 1900, \$1,041.47.

This work was transferred to control of Department of Marine and Fisheries on 24th August 1888.

## STEPHEN'S PIER.

Stephen's Pier, King's county, is situated on the southern side of the Montague River, about 6 miles above its entrance into Cardigan Bay, and immediately below "Lambert's Pier" and Montague Bridge. It consists of two wings or approaches about 50 feet apart and extending out from the bank of the river to the edge of the channel where the pier head has a frontage of 100 feet. The wings or approaches are respectively 90 and 115 feet long and are formed of close-faced timber work, the space between them being filled with brush and ballast discharged from vessels, gravel and clay being placed on top; these wings were originally connected with the pier head by "spans" or openings floor stringered and planked over.

The pier head is formed of pile bents, capped, floor stringered and covered with planking. This head block having become unsafe owing to age and destructive action of "toredo," was almost entirely rebuilt during the summer of 1897; 31 new bearing piles being put in and the floor stringers, covering, guard timbers and mooring posts being renewed. The timber facing of the eastern approach or wing was rebuilt during the year 1897-98. The expenditure incurred during the year for works of renewal and repair amounted to \$655.77.

Total expenditure to 30th June 1900, \$4,097.57.

This pier was transferred to control of Department of Marine and Fisheries on 25th August 1885.

## STURGEON PIER.

Sturgeon Pier, King's Co., is situated on the southern side of Cardigan Bay, about six miles south of Georgetown, the shiretown of the county and the terminus of the Georgetown branch of the P. E. Island Railway. The pier was constructed by the Local Government to give accommodation for the shipment of produce from the locality, and is one of the P. E. I. piers assumed by the Dominion Government in 1884, when a payment was made the Local Government of \$847.92 to cover the expense of repair of the pier between 1873 and date when taken over by the Department.

The pier consists of a shore abutment 250 feet long, and originally of four

blocks of from 20 to 25 feet in length, with intervening spans 25 feet wide. The faces of the approach and blocks are constructed of square timber, filled in with brush, stone and gravel the latter forming roadway. The two inner openings were some years ago filled in with brush at the bottom, and with poles, stone and gravel on top, the sides above the brush and poles being of close-faced timber so as to retain the stone and gravel filling, the two outer openings and the outer block are floor stringered and planked over.

During 1892 a cut was dredged from the channel to the wharf 720 feet in length and 100 feet in width; also a basin made at its end 170 feet wide, and berths of 100 feet in length by 55 feet along the sides, all of which carry a depth of 12 feet at low water. This dredging caused a tendency of the wharf to settle, and danger of it, or portions of it, sliding into the new cut; to prevent which, and for execution of some general repairs the sum of \$1,400 was expended during 1893-94 in close-piling the portions in danger, and since when, up to the past season, the work has remained in good and serviceable condition. Damage, however, to the roadway by a high tide occurred, repair of which, as also the renewal of some of the mooring posts, etc., were required and effected during the past fall at an expenditure of \$101.75.

Total expenditure to 30th June, 1900, \$8,763.44.

This pier was transferred to control of Department of Marine and Fisheries on 25th August, 1885.

#### TIGNISH.

Tignish, Prince County, is situated on the north coast of the Island some 8 miles from "North Cape"; the harbour is at the mouth of the river which here enters the Gulf of St. Lawrence. The coast line on each side of the river's mouth being quite straight for a long distance, gales from the north east to south east throw in a very heavy sea, and this acting on the shifting sands of which the beaches are for most part composed, frequently completely blocked up the entrance, which would remain so closed until broken through by some freshet or on occasion of an extremely high tide.

To keep the entrance permanently open and retain channel always in the same bed the Government of P. E. Island in 1868 began the construction of works on each side of the mouth of the river contracting the stream to width of 40 feet, the effect of which has been, by increasing the current to both, to give general increased depth of water and the entrance has never since been closed to navigation. Since Confederation the original works have been repaired, raised and extended by the Department, breast-works or beach protection has also been constructed on either sides over the low lying beaches to prevent the breaking through of the sea and a portion of the channel has been dredged, all of which has proved of the greatest benefit, increasing the business of the port as well as giving good accommodation for a shelter for the fishing boats and place of shipment for produce, and general merchandise.

Portions of the work having become much decayed and injured by the action of the ice, ravages of the toredo, etc., repair and strengthening of the outer end of the northern breakwater was required during the past season when the block was levelled up, ballasted and sides and end close piled; the beach protection on the north side was also made up for its entire length of 2775 feet, the cost of which works were \$1,411.15, the sum of \$664.60 was also expended in procuring timber for a proposed extension of the work during the present fiscal year.

Total expenditure to 30th June 1900 including dredging \$59,461.04.

#### VERNON RIVER BRIDGE.

The pier at Vernon River Bridge, Queen's County, is situated at the head of navigation on the Vernon River and about 2 miles above its entrance into Orwell

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Bay. It is built on the lower side of and distant 30 feet from the public road bridge, to which it is connected by an approach averaging 30 feet in width. The pier consists of a close faced block 120 feet long by 30 feet wide, lying parallel to the channel; along its outer face there is a depth of 9 feet at low water, or 17 feet at high water springs; it is reached by a channel or approach about 1 mile long carrying this depth, which has been dredged to it by the department, between 1877 and 1882, through oyster beds on the down stream side, at a cost of \$6,326.72. This pier is one of the Prince Edward Island piers the control of which was assumed by the Dominion Government in 1884, at which time the sum of \$908.66 was paid to the Island Government to recoup expenditures made upon it for repairs after Confederation up to 1884.

As the pier was an old structure much out of repair at the time it was taken over by the Dominion, some expenditure had to be incurred nearly every year since, to keep it in a passable state for traffic; the outlay for "Construction and Improvements" amounting, at the end of the fiscal year 1897-8, to \$1,705.16, and that chargeable to "Repairs" to \$741.45. By adding the cost of dredging to these amounts the total expenditure incurred by the Dominion on this pier up to June 30, 1898 is found to be \$8,773.33.

During the year of 1899 a sum of \$146.87 was applied in replacing floor stringers, covering, and guard timbers on the outer half of the pier, and making general repairs on the inner part; rebolting fenders, &c.

This pier was transferred to control of Department of Marine and Fisheries, on 24th August, 1888.

## VICTORIA (CRAPAUD).

Crapaud or Victoria Pier, Queen's County, is situated at the head of navigation in the Crapaud Basin, at Victoria Village, which is the most important port of shipment after Summerside on the south-western coast of Prince Edward Island. It is about midway between Charlottetown and Summerside harbours, and about 11 miles distant (south) from Emerald Junction on the line of the Prince Edward Island Railway, and is the outlet of probably the most fertile and best tilled district on the island. At different times since Confederation the department has expended considerable sums in dredging to improve the approach, from deep water outside to the pier, and it has also expended in 1884-85, on assuming control of the work, a sum of \$953.84 in repairing and improving it.

This pier has a total length of 486 feet, consisting of shore abutment or approach 286 feet long and 20 feet wide, a middle section 143 feet long and 37 feet wide, and a pier head 57 feet long and 58 feet wide; its height is 19 feet at the outer end, where a depth of 9 feet is now found at low water; the channel having during the year 1896 been dredged to that depth for a width of 60 feet and a basin formed in front of the pier where vessels can turn. With the exception of the approach, which is built solid, the work is composed of alternate "blocks" and "spans" floor stringered and planked over. During the spring of 1897 the sum of \$199.51 was expended on general repairs; the work done consisted in putting in two new mooring posts, 20 fender piles, 9 span beams, renewing the broken and decayed planking and making up the roadway of the shore abutment with broken stone.

Total expenditure to 30th June 1900, including purchase, \$17,422.86.

This pier was transferred to control of Department of Marine and Fisheries on 24th August, 1888.

## WEST POINT.

West Point Wharf, Prince county, so called from being at the most extreme western point of the island, is situated on the north side of Egmont Bay along the

eastern shore of Northumberland Strait, about 14 miles west from O'Leary Station on the line of the Prince Edward Island Railway, and 35 miles by water from Summerside. A pier, one of those assumed by the department in 1883, was built previous to Confederation by the local government to afford landing and shipping facilities for the district; there being at the time no wharf nor harbour in existence where vessels drawing more than a few feet could call, along the whole coast between Summerside and North Cape, a distance of 60 miles. West Cape being midway between these points, was considered a favourable site for a pier, and the original work built at this point is said to have proved of great benefit up to the spring of 1884, when it was seriously damaged on the breaking up of the ice. A large field of ice was at that time driven upon it during a severe easterly storm and the entire outer portion of the pier moved out of position, the face timbers being broken and a large quantity of ballast washed out, and subsequent storms, ice shoves and drifts almost completely destroyed the structure.

The original pier proved an expensive one to keep in repair, and expenditures amounting in the aggregate to \$4,226 had to be made by the local government between 1873, when Prince Edward Island entered Confederation, and 1884, when full control was assumed by the Dominion, in order to maintain the structure in a passable state for traffic.

With a view of providing urgently called for and much needed improved landing and shipping facilities, the department entered into contract December 17, 1897, for: (a) Building up to 4 feet above high water and repairing the remaining portions of the old pier, 290 feet long and 27 feet wide. (b) Constructing an extension of close-faced square timber, full ballasted cribwork, 325 feet long by 30 feet wide at top, to reach to 8 feet depth at low and 11 to 12 feet at high water spring tides. The works of reconstruction and extension were commenced on March 3, and fully completed on November 10, 1898, at a total cost of \$10,008.36, inclusive of inspection, &c., the contract price being \$9,500.00.

Total expenditure to 30th June, 1900, including purchase, \$14,272.43.

This work was transferred to control of Department of Marine & Fisheries on 24th August, 1888.

#### WOOD ISLANDS.

Wood Islands, lot 62, Queen's County, are situated on the Strait of Northumberland, about 15 miles to the westward of Cape Bear, and are the most southerly point of Prince Edward Island. They are two in number, lie parallel with the shore, from which they are distant about half a mile, and are connected by a small sand beach, also by another beach extending from the western end of the western island to the mainland, forming a total length of nearly a mile. A pond is thus enclosed having an area of about 300 acres, with its outlet at the south-eastern corner. This pond is too shallow to serve even as a boat harbour, and an attempt was made to form a shelter for boats and small vessels by the construction of works extending eastwardly, from the sand spit and parallel with the shore, with the expectation that scour would be produced by the tidal outflow from the pond and a deepening of the channel so formed would take place, but the attempt resulted in failure. The work which was constructed by the local government, was 2,530 feet in length, of varying heights and widths, and built of brush and stone for a foundation with a superstructure of timber cribwork.

During 1878-9 a breakwater 350 feet in length was constructed by the department on the western side of the entrance, and during the same year an attempt was made to deepen the channel along the eastern breakwater, but the work had to be abandoned.

Between 1880 and 1885 the sum of \$8,871.16 was expended in extending the



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western breakwater, and during 1886 the sum of \$1,000 was spent in effecting necessary repairs to the eastern breakwater.

In December, 1893, a contract was entered into for the reconstruction and repair of the eastern breakwater, and at the close of the fiscal year about one-third of the work contracted for had been completed.

On the 30th November, 1894, the work under contract was satisfactorily completed, and has already given promise of great benefit to the district as a shipping point, the depth of water having increased two feet, which it is hoped will continue without the aid of a dredge.

During the fiscal year 1895-6 the sum of \$686.63 was expended in close-piling the channel or inward side of the work at what is known as the "Loading Berth" so as to prevent undermining and injury to the bottom portion of the breakwater. The piling consists of spruce and hardwood spars 9 inches in diameter at the small ends and driven from 8 to 10 feet into the original bottom, their tops being secured to the face timbers by three and four one inch round iron bolts.

Total expenditure to the 30th June 1900, \$29,158.24.

This work was transferred to control of Department of Marine and Fisheries on 25th August, 1885.

## PROVINCE OF NEW-BRUNSWICK.

## ANDERSON'S HOLLOW.

Anderson's Hollow, Albert county, is a cove of Salisbury Bay, on the north-west side of Chignecto channel in the Bay of Fundy. Spring tides rise 40½ ft., neaps 32½ ft.

The breakwater wharf at this place was begun in 1879 by the construction of a detached block 550 feet from the shore with which it was afterwards connected. In August 1885, the work was 290 feet in length, and three years later was carried to the shore. The structure, 25 ft wide on top, was originally 27 feet high above the bottom at the outer end, but owing to the accumulation of littoral drift is now 3 or 4 feet less. It is built of round cribwork, lightly battered on the inside, but sloped at half to one and sheathed on the weather face. The breakwater was damaged by storm on November 21, 1895, when a small light-house placed at the outer end was swept away, together with part of the break, while some of the top work at the head was simultaneously shaken and started. In 1895-96, a small sum was applied to bolting loosened timbers for temporary security. During the fiscal year 1896-97, the inside face of the wharf at the outer end, which had received a heavy list in the storm of the previous year already mentioned, was taken down and rebuilt for a distance of 75 feet on the top and 44 feet on the bottom. The list was taken out, the new face being carried to a height of 15 feet in order to level the top, and new covering was laid for a length of 75 feet. Seventy feet out of 110 feet of dismantled break were reconstructed, and fenders were placed on the inside of the new face. The total expenditure to the end of 1897-98 amounted to \$8,338 13 : \$7,224.04 of which amount may be charged to "Construction and improvement," and \$1,114.09 to "Repairs." In 1898-99, by an expenditure of \$121.31, twenty-seven pieces of new sheathing were laid and bolted to the sloping face; a cap and face-timbers were inserted, and the gap in the break 40 feet long, left unfinished at the previous repairs, was built up with four tiers of timbers strengthened with knees. Like many other

works in the Bay of Fundy, Anderson's Hollow crosses the direction of the flood stream and of the prevailing winds. In consequence, an accumulation of littoral drift found on the south-west side, which the work considered as a groyne being now fully charged travelling round the end, is being deposited under the lee of the breakwater, forming a shoal which is an obstacle to vessels coming to Anderson's Hollow for cargoes of lumber.

Total expenditure to 30th June 1900 is \$92,888.35.

#### BAY DU VIN.

Bay du Vin.—The wharf at Bay du Vin in Mirauchich Bay, 20 miles from Chatham and almost opposite to Burnt Church, is a provincial government work, originally 760 feet long, composed of blocks and spans of round cribwork 18 feet wide, with a pier-head 80 x 29, standing in 9 feet at L. W. or 14 feet at H. W.

A year or two after completion, the pier-head and two outer blocks were swept away by ice, while a third was considerably injured. A sum of \$1,100, voted for expenditure during 1899-1900, being insufficient to effect restoration of the work, a portion of it was devoted to repairing the outer end of the part of the work still remaining. The upper part of blocks 7, 8 and 9 were rebuilt for three tiers in height: stringers were placed over the span between blocks 7 and 8; and block 10, which had settled considerably and had lost a foundation timber, was removed. The wharf was found upon examination to have suffered considerably from the teredo.

The expenditure for the year 1899-1900 (and the total expenditure upon the wharf) amounted to \$610.04.

This is really a Provincial work over which the Federal Government has no control.

#### BAY VERTE.

Bay Verte is situated in Westmorland County, on the eastern coast of New Brunswick, &c., &c.

On the 28th November 1887, a contract was entered into for the construction of a ballast wharf 100 feet long by 40 feet wide near the head of the bay, and the work was satisfactorily completed at the end of the fiscal year.

No important repairs were made to this ballast wharf since 1888.

Total expenditure to 30th June 1900, \$4,981.84.

#### BELLIVEAU.

Belliveau, Westmorland County, is situated on the eastern side of the Petitcodiac River, opposite Hillsboro, Albert County, and distant about 16 miles south from Moncton or 8 miles north from Dorchester, both important stations on the Intercolonial Railway.

Belliveau and vicinity are thriving and prosperous settlements, the inhabitants being now principally engaged in agricultural pursuits; the destruction, in 1869, of a wharf at the place, having seriously interfered with the shad fisheries, and preventing the shipment of the surplus produce raised in the district, or the cheap import of supplies required. To remedy this, in March, 1888, a contract was entered into for the construction of a wharf 200 feet long and 24 feet in width (measured on top), after which it was arranged with the contractor to extend the work 33 feet, all of which was satisfactorily completed on the 9th November, 1888.

Spring tides rise 45 feet, neaps 38 feet. The end of the work is about 200 feet from line of low water, and there is a depth at ordinary tides of 14 feet of water, or 18 feet at high water spring tides.

No important repairs have been made on this wharf since 1889.

Total expenditure to 30th June 1900 is \$2,600.27.

## BLACK RIVER.

At Black River, St. John's County, a small cove on the Bay of Fundy, 12 miles east of St. John, where spring tides rise about 25 feet, a breakwater or wharf of square cribwork, 155 feet long, 27 feet wide, and 30 feet in extreme height, was built by the department in 1879, for the use of coasting vessels. Between 1891 and 1893 the work received small repairs, and the total expenditure up to June 30, 1898, amounted to \$4,407.92, \$3,907.40 of which may be charged to 'Construction and Improvements,' and \$500.52 to 'Repairs.' During the year 1898-99, a sum of \$450 was expended in replacing 36 fenders, in taking up and re-laying the covering, in building ladders, etc. For some years no shipments were made at Black River; of late, lumber cut by portable mills in the neighbourhood has been loaded at this work.

Total expenditure to 30th June, 1900, is \$4,407.92.

## BUCTOUCHE.

Buctouche. By a narrow and winding channel, navigable for 11 or 12 miles, and 4 to 5 fathoms deep in some places, but with a ruling depth of only 8 feet, Buctouche River flows into Northumberland Strait, about midway between Richibucto and Shediac, the embouchure being about 18 miles from each of these places.

Four miles from the sea, at the village of Buctouche (pop. 600), in the county of Kent, a quay for local traffic was built at right angles to the bridge and parallel to the river bank in 1884-6 at a total expenditure, including approaches, of \$4,259.55. The work is of round timber fendered with piles, and stands in a depth of 17 feet at low water, or 21 feet at high water spring tide, the length of face and width of top being respectively 300 feet and 40 feet. Some traffic in lumber and coal is carried on here, while the opening of a quarry above the railway bridge renders it probable that stone may also be shipped from this work. A siding of the Moncton & Buctouche railway is carried for a part of the way along the back of the wharf, but on an independent foundation. From 1886 to 1894 no repairs were made, but in 1894, the wharf having been partially destroyed by fire, repairs were begun though not completed.

In the year 1898-9, a sum of \$978.13 was applied towards procuring materials, and repairs to the upper portion of the wharf were made during the fiscal year, the contemplated work being completed, except the fastening of the fender piles and covering, and placing the cap-timber. The work done consisted in driving 111 piles in 20 bents, in order to remove the weight of the superstructure from the worm-eaten cribwork. These bents, spaced 8 feet apart and braced both longitudinally and transversely sustain the weight of the stringers and covering. An extent of wharf 158 feet long and 25 feet wide was thus renewed.

Total expenditure to 30th June, 1900, \$7,949.99.

This work was transferred to control of Department of Marine and Fisheries, on 19th August, 1885.

## BURNT CHURCH.

Burnt Church, a fishing and farming settlement in Northumberland is situated on the shore of Miramichi Bay, about 22 miles north east of Chatham and 5 or 6 miles south of Neguac.

During the year, a contract was let for a block and span wharf of round cribwork, 1,180 feet in length, composed of blocks 21 feet long and 20 feet wide, placed 20 feet apart, forming an approach to a pier-head 60 feet long and 40 feet wide, standing in 9 feet at low water. Spring tides rise 5 feet.

By the end of June 1900, the cribwork of the shore approach 200 feet in length, had been brought to within a couple of feet of full height; while 12 out of 23

blocks had been sunk in place and brought nearly to the level of high water. The progress made represented about one eighth of the total contract.

Total expenditure to 30th June 1900, \$3,304.08.

#### BURTON.

Assistance was given by the Department in 1897-8, towards the payment for a wharf built by the Provincial Government of New Brunswick at Burton in Sunbury County.

The wharf is 56 feet long in the face standing in about 4 feet in low water, is situated near Oromocto on the main river St. John.

Total expenditure to 30th June, 1900, is \$180.00.

#### CAMPBELLTON.

Campbellton, Restigouche County, a thriving town and a station of the Intercolonial Railway, stands on the south bank of the River Restigouche, 14 miles above Dalhousie and about 6 miles below the head of tide. The Restigouche, for many miles the boundary of Quebec and New Brunswick, traverses large areas of well-wooded country. By this waterway, timber is brought to the mills of Campbellton and Dalhousie, whence in the form of deals, boards and shingles it is shipped to foreign and domestic markets. Three fathoms are found at the town, but the ruling depth given by an extensive shoal of sandy material styled "The Traverse," a couple of miles below, is only 11 feet at L.W.S.T. Spring tides rise 11 feet.

For reception of the ballast of vessels engaged in the deal trade, the Department began in 1889 a detached block of square cribwork 140 feet long and 35 ft. wide, in about 21 feet at low water. Three years later, this work was connected with an adjacent private wharf, upon which is laid the siding of the International railway, by a block similar in character to the first but only 110 feet in length. The combined structures are used as a ballast and loading wharf. Immediately at the face of the work the depth has shoaled to 11 and 15 feet, but at a little distance out a maximum depth of 20 feet at L.W. is found.

The deal shipments for 1899, principally trans-Atlantic, were 18,146,988 superficial feet. During the past fiscal year, 112 close-piles were driven along the outer face of the upper block; new fenders, either long or short, were placed on all sides of the lower block; while both (originally unequal in height) were levelled up and brought flush on the top, receiving new upper cross-ties, stringers, covering and cap-timbers. Three new mooring-posts were also placed in position.

Total expenditure to 30th June, 1900, \$20,589.01.

This work was transferred to control of Department of Marine and Fisheries on 29th May 1891.

#### CAPE TORMENTINE.

Cape Tormentine, at the extreme eastern end of Westmoreland county, is the most prominent headland on Northumberland Strait and the south-western terminus of the winter ferry route between Cape Traverse or Prince Edward Island and the mainland. Spring tides rise 7 $\frac{3}{4}$  feet; neaps, 3 $\frac{1}{4}$ .

Between 1886 and 1892, a breakwater pier was constructed at this cape with a view of forming an artificial harbour for purposes of interprovincial communication, at the extremity of a peninsula which is the nearest point on the continent to Prince Edward Island. The harbour works comprise a straight pier 2,500 feet long with head and return, each 400 feet in length, enclosing a basin about four acres in area with a ruling depth of 15 feet at low water, or 22 feet 6 inches at high water spring tides. For a distance of 1,300 feet from the shore, the pier is

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a rubble mound 20 feet wide on top with pitched slopes of 2 to 1, while the remainder of the straight portion (400 lineal yards) is built of close-laced cribwork 30 feet in width. The head and return are of similar cribwork but are 40 feet in breadth from the base to low water, decreasing to 30 feet at the finished top (4 feet above high water spring tides) and presenting a sloping face sheathed with hardwood to the north and east. The waters of this part of Northumberland Strait are infested by the teredo. A branch line thirty-six miles long connects the pier with the Intercolonial railway at Sackville.

There being a storm wave at least six feet in height at Cape Tormentine, it was found that although the rails were secure where spiked to the covering of the cribwork, they were liable at the elevation of 4 feet above high water to be washed off the embankment or rubble mound, which afforded no facilities for bolting. To prevent interruption in the traffic from this cause, the rails were raised two feet along the embankment in 1893-4. At the same time, a freight shed was built and protected by a break. The tops of the cribs receiving the foot of the hardwood sheathing composing the sloping, having been destroyed by the teredo, the planks thus left hanging are exposed below to upward wave motion, a force found by Stevenson to be eighty-four times greater when exerted vertically than when directed against the side of the breakwater. These planks were secured in 1893-4, as far as the worm-eaten condition of the timber permitted. In the following fiscal year, 321 lineal feet of worm-eaten longitudinals supporting the sloping hardwood were replaced by new timber, a space of 90 lineal feet of new planking was laid and the remainder of the face secured wherever bolt-hold could be found in the honeycombed wood.

In 1895-6, similar temporary repairs were made, 414 lineal feet of worm-eaten longitudinals being renewed with fresh timber and 117 lineal feet of sloping face being re-laid.

In 1896-97, repairs of the same kind were made for 154 lineal feet of the sloping face, in which 534 lineal feet of longitudinals were used. There being some slight difference of duration in favour of hardwood, birch longitudinals were for the most part inserted and secured with screw bolts. The ramp, 165 feet long, leading from the embankment to the cribwork was also covered with 3 inch plank in order to permit the passage of carts for occasional local traffic.

In the following year, new hardwood longitudinals (generally four tiers) were placed in the work and secured with screw bolts for a distance of 252 feet, to which the planks of the sloping face were secured. For a further distance of 50 feet the face timbers were partially renewed.

During the year 1898-99 the talus on the northern side, begun at the time of the construction of the work in 1890, was extended 500 feet, or to the end of the straight pier, by a deposit of 2,313 cubic yards of large stone, brought generally at the top to low water mark. About 80 cubic yards in total quantity were added to the talus, also begun nine years ago on the inside of the pier. For 103 lineal feet, the sheathing and face timbers of the sloping face were renewed, 200 lineal feet of face timbers were inserted, and 102 close piles were driven. The mail room in the boat house was enlarged and refitted in time for the winter service between the mainland and Prince Edward Island.

In the past fiscal year, the talus was reenforced and extended around the pier head, a distance of nearly 200 feet, by the addition of 1,232 cubic yards of large stone. The sheathing of the sloping face was either renewed or relaid for a distance of 182 lineal feet; close piles were driven on the inside of the work; and the sides of the ramp were planked. The harbour is used during the season of navigation by vessels engaged in the deal trade with the United Kingdom, since it affords facilities, not only for quick despatch, but also for transferring deals in clean condition from train to ship without the loss of class, and so of price, occasioned by rafting.

On account of the prevalence of the teredo, any works built in Northum-

Herland Strait should properly be constructed of creosoted timber, stone, or concrete. The worm-eaten condition of these works requires that the course hitherto customarily taken in similar cases, and now adopted at Cape Tormentine (i. e. external protection with stone) should be continued to completion. For the quay-face of the winter berth when permanently made, concrete would be desirable. Although the top appears to be in fair condition, the substructure of the cribwork of the pier has been so injured by the teredo that the upper works, though sound, are liable to be sheared off the impaired foundation by ice or storm.

Total expenditure to 30th June 1900, \$251,700.97.

This work was transferred to control of Department of Railways and Canals on 12th April 1893.

## CARAQUET

Caraquet, Gloucester county, is situated on the southern shore of the Baie des Chaleurs, about 42 miles to the eastward of Bathurst, the shiretown of the county.

To a block and span wharf 1,205 feet long, built by the local government, a pier-head of square timber cribwork was added by the department in 1884. The block is 100 feet long by 24 feet wide, height and breadth being equal. It is placed in 9 feet at low water, above which level spring tides rise six feet. Caraquet, a good harbour for coasting vessels and a station on the Caraquet Railway, is the headquarters of a large fishing fleet which proceeds to sea usually by way of Shippegan Gully.

No repairs were made to this work from the time of completion until 1898: the total expenditure to the end of 1897-8 amounted to \$4,471.54. During the year 1898-9 a sum of \$499.88 was applied as follows, viz.: the whole of the stringers and covering was renewed, two mooring post were placed in position, and thirty-nine hardwood fender-piles were driven round the blocks.

Total expenditure to 30th June 1900, is \$4,986.23.

## CHATHAM.

Chatham.—On the Miramichi stand two principal towns, Chatham and Newcastle, the former 5 miles below the latter. The exports of both, principally lumber and wood pulp, and the clearances for the fiscal year 1899, were respectively as follows:

1899.

Chatham, exports.....	\$1,402,231
Newcastle, exports.....	651,405
Total.....	2,053,636

## SEA-GOING VESSELS, CLEARED.

	No.	Tonnage.
Chatham .....	78	74,745
Newcastle.....	71	38,842
Total .....	149	113,587

For the calendar year, the deal shipments of the Miramichi aggregated 129 million superficial feet: while for the fiscal year the output of the two pulp mills was valued at \$420,500.

Chatham, ranking second in order of commercial importance among the ports of New Brunswick, has a population of about 6,000, and is a station of the Canada Eastern Railway.

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The Custom House wharf at Chatham consists of 3 faces, viz : two sides, respectively 171 feet and 89 feet long, and a river face 112 feet in length. This old structure, doubtless originally used as a place of deposit for ship's ballast, had become much dilapidated, and repairs were begun by the Department in May, 1900.

By the end of the fiscal year, the greater part of the longest side had been rebuilt and nearly completed. A considerable part of the grading intended to be done between the faces had also been finished.

The expenditure for the year 1899-1900 (and the total expenditure upon the wharf) amounted to \$2,046.18.

## CHIPMAN.

Assistance was given by the department in 1897-98, towards the payment for a wharf built by the Provincial Government of New Brunswick at Chipman in Sunbury County.

This wharf is 80 feet long in the face, standing in about 8 feet at low water, is situated on the Salmon River at the head of the Grand Lake system of navigation.

Total expenditure to 30th June 1900 is \$300.00.

## CLIFTON.

Clifton.—At Clifton, in Gloucester County, a station of the Caraquet railway 10 miles west of Grand Anse and 7 miles east of Bathurst, a breakwater originally 425 feet long, built by private enterprise to facilitate the shipment of stone from the adjacent quarries, was acquired by the department in 1878, and was extended in the same year to the present dimensions at a cost of \$9,681.75. The work of round and square cribwork, partly protected by random stone, is now 750 feet long over all, 220 feet of this length being a pier head placed at an acute angle to the approach in order to give shelter between east to north-west.

General repairs were made in 1886-87 and in 1887-88, consisting of ballasting, sheathing, fendering and restoration of breaches in the work.

General repairs were continued from 1891 to 1893 and the foundation of a talus was placed on the outside.

In 1897-98 general repairs were again made and a slope of heavy stone, averaging nearly one cubic yard each, was placed for 145 feet around the angle of the work.

Formerly the deepest berth was said to give 11 to 12 feet at low water, but this depth has now been reduced by shoaling. This artificial harbour affords the only shelter for fishing boats between Caraquet and Bathurst, a distance of about 37 miles. Spring tides rise 7 feet.

The face-timbers of this work, now much shaken, are protected by vertical hardwood fenders, which, as there is little bolt-hold, are frequently displaced.

In 1898-99, ordinary repairs were made to fenders, covering, and break. During the past fiscal year, the talus was continued by the addition of 196 cubic yards of large granite; two serious breaks in the face, respectively 16 and 19 feet, were thoroughly repaired by the insertion of cross-ties and face-timbers, secured by screw bolts to fenders on the outside, and to shores on the inside of the work. New stringers and covering were placed for a total distance of 209 lineal feet.

Preparations were also made for construction of the talus by laying a tramway for carriage of heavy stone from the quarry along and around the work, a turn-table being placed at the angle. Materials were procured for a new hardwood block, 70 x 40 feet, intended to be placed on a dredged foundation for the purpose of stopping the talus at the pier-head, and a part of the materials

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were framed ready for building. The absence, however, of a dredge to prepare the foundation prevented the actual construction of this block from being begun.

Total expenditure to 30th June 1900, \$24,135.89.

This work was transferred to control of Department of Marine & Fisheries on 9th November 1894.

#### COCAGNE.

Cocagne, Kent County, on the west coast of Northumberland Strait, is ten miles south of Buctouche, another harbour with sandy entrance under conditions similar to those which obtain at this place, at Miramichi and Richibucto, and has a depth of 10 feet on the bar at low water, or 14 feet at high water spring tides. Inside, from  $2\frac{1}{2}$  to 4 fathoms are found in a narrow channel for about three-quarters of a mile. Afterwards, mud flats  $1\frac{1}{2}$  mile in length, covered by 4 to 6 feet at low water, extend nearly to the highway bridge, where a depth of from 2 to  $2\frac{1}{2}$  fathoms is found in mid-channel.

In 1881-82, the department began the construction of a cribwork quay 400 feet long and 20 feet wide, leading from the bridge and carrying a depth of from 9 to 11 feet at the face. In 1888, the wharf having settled irregularly was levelled up and widened for a distance of 100 feet, and in 1892 received similar attention.

The structure having become worm-eaten and settlement having taken place, repairs were begun in 1898-99 on a part 176 feet long (sufficient for local needs), and by the end of the year were almost completed with the exception of the ballasting, some stringers, and the covering. The method adopted for carrying on the required repairs consisted in driving twenty-four bents of four piles each, which, secured by walings and bracing, would support the new superstructure independently of the worm-eaten cribwork.

During the last fiscal year, the repairs undertaken in 1898-99 were finished by the addition of the covering, cap, some stringers, bracing, and ballasting. The new top was also widened 10 feet at the back by the deposition of 253 cubic yards of stone, brought flush with the covering.

Total expenditure to 30th June, 1900, \$11,919.32.

#### COLE'S ISLAND.

Assistance was given by the Department in 1897-98 towards the payment for a wharf built by the Provincial Government of New Brunswick at Cole's Island, in Queen's county.

During the year 1898-99, certificate was given for payment of the following sum as contribution towards the Provincial Government wharfs:

To Cole's Island, in Queen's county, at the head of navigation of the Washademoak, a combined high and low water wharf, 135 feet long in the face, standing in about six feet at low water, \$388.50.

Total expenditure to 30th June 1900 is \$388.50.

#### COURT HOUSE.

Assistance was given by the Department in 1897-8, towards the payment for a wharf built by the Provincial Government of New Brunswick at Court House in Sunbury County.

The wharf is 42 feet long in the face, standing in about 6 feet at low water and is situated on the main river St. John.

Total expenditure to 30th June 1900 is \$240.00.



## DALHOUSIE.

Dalhousie, a seaport in the county of Restigouche at the head of Baie des Chaleurs and a station of the Intercolonial Railway, possesses a secure harbour, from 6 to 7 fathoms deep, which, during the season of navigation, is the best in New Brunswick. It is the only one on the gulf coast of the province suitable for a coaling station for the fleet.

For the use of vessels engaged in the deal trade, the department added in 1887-88 to the Intercolonial Railway pier a ballast wharf, 300 feet long, 23 feet wide on top, placed parallel to the shore in about 15 feet at low water, a depth now reduced by shoaling to about 5 feet in some places. Spring tides rise 10 feet.

Repairs were made in 1891-92-93 and 1895-96.

Expansion of the ice, consequent upon the cracks caused by tidal fluctuation, exerts from the shore a shearing stress against the top of this work, which was in 1897 thrust over about 10 feet, the displacement extending for about 118 feet along the work.

The shipments, principally trans-Atlantic, of deals and boards, &c. for 1897 amounted to 27,240,080 superficial feet.

During the past fiscal year, seven tiers of the sheared top have been rebuilt for a length of 163 feet, and about half ballasted. The work is now four tiers below the finished height. Most of the materials necessary for completion of the repairs are now on hand.

Total expenditure to 30th June, 1900, is \$13,084.81.

## DIPPER HARBOUR.

Dipper Harbour, St. John Harbour, and on the eastern side of Point Lepreau. In 1874, a breakwater, 450 feet long, was built on its western shore. The structure was much damaged by a destructive gale which visited the Bay of Fundy in the winter of the same year. The total expenditure has been \$22,244.52.

No expenditure has been incurred on this breakwater since 1880.

Total expenditure to 30th June 1900 is \$22,244.52.

## EDGETT'S LANDING.

Edgett's Landing in Albert is on the west side of the Petitcodiac River, two miles below the village of Hillsborough.

To replace an old provincial government work, destroyed by the Saxby Gale in 1869, the construction of a wharf was begun 20 years later by the department, and was finally completed in the fiscal year ended June 1893. The wharf is 400 feet long, composed of an earthen approach 20 feet wide, and 50 feet in length; round cribwork 250 feet and square crib-work 100 feet long. The head is 40 feet wide. Spring tides rise 46 feet. The pier head, 35 feet high, stands in 30 feet at high water and is dry at low water.

Renewal of the covering, which had become decayed, was begun in May 1900, and some progress had been made by the end of the fiscal year.

Total expenditure to 30th June, 1900, \$9,646.09.

This work was transferred to control of Department of Marine and Fisheries, on 19th June, 1895.

## FORT DUFFERIN

Fort Dufferin (St. John Harbour), a 10 gun battery built by the British Government on a headland to command the western entrance to St. John Harbour, stands at the shore end, but much above the level, of Negropoint break-water.

In order to preserve the headland from erosion by the waves, this department began in 1882 a retaining wall of sheathed cribwork 430 feet in length, and in the following year constructed a further length of 303 feet. The work is exposed on the one hand to the force of the waves, and on the other to land-slips. In 1886-7 it was much disturbed by the sea, and repairs were made in that, and the following year, 205 feet of the original work being rebuilt. From 1887 to 1889 repairs were also made, and in 1890 the work was extended 100 feet. General repairs were made in 1893-4. The work is 7 to 14 feet wide on top and about 9 feet in mean height. The crest for almost the whole length is surrounded by a break 2½ feet high.

During the year 1896-7 a gap 81 feet long in the break was repaired, 200 lineal feet of longitudinals were renewed inside, and 128 cubic yards of ballast were restored to the work, while the sheathing was patched at intervals along the face with hardwood planking. In order to raise the beach and reduce the area of timber face necessary to be repaired, towards the end of 1896 a groyne, 40 feet long, 10 feet wide, and 4 feet in mean height, was built of hardwood piles, timber and stone. In 1897 the final extension of the cribwork, a distance of 130 feet, was begun, and by the end of the year 1896-7 was brought within two tiers of the full height.

In 1897-8 the new extension was completed, ballasted and sheathed. Small repairs were also made to the sheathing of the old work.

In 1898-9, four groynes, in all 232 lineal feet each built of hardwood piles 4 feet apart, driven from 9 to 12 feet into the bottom and planked with birch 9 inches square, securely strapped and bolted, were placed along the beach to protect the lower part of the sheathing of the breastwork; some ballast was also placed in the cribwork.

Ordinary repairs, comprising restoration of a breach in the face, ballasting, and renewal of sheathing, were made during the year.

The total expenditure to the 30th June, 1900, is included in the total for Negro-point. In 1899-1900, the expenditure has been \$800.

#### GARDNER'S CREEK.

Gardner's Creek, St. John County, enters the Bay of Fundy some 20 miles east of St. John Harbour, and 14 miles from St. Martin's Railway station. Spring tides rise 30 feet, neaps 25 feet.

On the 1st of July 1895, a contract was let for the construction of a wharf near the mouth of this creek, intended to facilitate the shipment of the lumber and piling sent coastwise from this locality.

The wharf, placed in a cove sheltered from direct south-west winds by McCoy's Head, consists of substantial open-faced cribwork 215 feet long, sheathed on the north and east. The head stands in a depth of 21 feet at high water spring tides, and affords one berth for coasters; but, as in the case of all other wharfs on this coast, is dry at low water.

This wharf was completed on the 29th October, 1896, for the stipulated price of \$7,400; the workmanship is of superior character. The total expenditure incurred during the fiscal year 1896-97, amounts to \$5,308.75.

Total expenditure to 30th June, 1900 is \$8,089.32.

#### GEROW.

During the year 1898-99, certificate was given for payment of the following sum as contribution towards the provincial government wharf at Gerow, which is 50 feet long in the face, standing in five feet at low water, three miles from Thompson's wharf in Queen's county, \$341.25.

Total expenditure to 30th June 1900 is \$341.25.

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## GRANDE ANSE.

Grande Anse, Gloucester County, is situated on the southern shore of the Baie des Chaleurs, about midway between Bathurst and Shippegan harbours. It is a thriving settlement, having a railway and telegraph station on the line of the "Caraquet Railway." The cove from which it takes its name is near excellent fishing grounds and fishing as an industry is largely followed by the inhabitants of the district, some 90 fishing boats being engaged.

To afford protection to these, the department, in 1875, began the construction of an isolated breakwater, placed at about 600 feet from the shore, sheltering an area carrying a depth of from 5 to 7 feet at low water; this work, which was seriously damaged by the action of the ice during the winter of 1886, was reconstructed and added to during 1887-88-89, and consists of the main structure, 230 feet long and 30 feet wide and an L or return on the western end 150 feet long by 20 feet in width, forming a safe and convenient refuge.

The sheltered area, however, is in part obstructed by ballast and remains of old work that was carried into it by the ice during the storm of 1886, and the removal of a portion of this debris has been effected during the fiscal year 1894 at a cost of \$182.17, advantage being taken of low spring tides.

No important repairs have been made on this breakwater since 1894.

Total expenditure to 30th June 1900, is \$19,929.72.

## GRAY'S ISLAND.

Gray's Island, Albert county, is situated on the western bank of the river Petitcodiac, about 2 miles to the northward of the village of Hillsboro'. Properly it is not an island, being a hill of gravel on the bank of the river, rising some 20 feet above the general level of the surrounding marsh lands.

An extensive shipping business is carried on from this locality, it being provided with good wharfs which are approached by a public highway, and by a branch line extending from the Albert County Railway.

The wharfs, however, at times, are difficult and dangerous for the approach or departure of large vessels, and great difficulty being experienced in holding them to the wharfs during the ebb tide, which sets very strongly against them.

The construction of a breakwater, 300 feet in extreme length, and placed at a point some 2,000 feet above the wharfs, was decided on, and during 1891-92 the work was completed.

The first 100 feet, or inner end of the work, is merely ordinary "clay dyking" 5 feet wide on top, sloping one to one on the sides. The next 100 feet outwards is of round logs, open crib work, 15 feet wide on the top, sloping 1 to 4 on the sides. The next 50 feet has its upper 30 feet built in a similar manner to that last described, excepting that the upper or northern face has the outer longitudinal face built of square timber, which is close-sheathed with square spars, flatted to 6 inches in thickness, the bottom portion being built plumb, and its northern face protected by close-piling. The outer 50 feet is 25 feet wide on top, and its upper 30 feet, is built to a batter of 1 in 4 on the northern side, 1 in 12 on the end, and 1 in 2 on the southern or down-stream side, the bottom portion being built plumb, and having both the sides and the end protected by close-piling, and the upper portion by close-sheathing of spruce and hardwood. Ballast floors were placed at the specified heights, and sufficient ballast provided to about one half fill the structure.

During July 1893, the sum of \$400 was expended in restoring a portion of the "clay-dyking" damaged during high tides by the wash of the sea, and protecting the whole northern face with sheathing; and where settlement in the breakwater had taken place owing to the soft nature of the foundation, the work was raised to its original level.

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No important repairs have been made on this breakwater since 1894. Total expenditure to 30th June 1900 is \$6,395.29.

## GRAY'S POINT.

Assistance was given by the Department in 1896-97, towards the payment for a wharf built by the Provincial Government of New-Brunswick at Gray's Point, in King's county.

The wharf, at Gray's Point, on Belleisle Bay, a tidal reach of the St. John, is 196 feet in length over all (181 feet being cribwork) about 18 feet in general width and 42 feet broad at the pier head, which stands in a little over 3 feet depth at low water. It is built in the usual style of round cribwork with square cap, fendered and loaded with ballast 2½ feet deep topped with sand.

Total expenditure to 30th June 1900 is \$500.

## HERRING COVE.

Herring Cove, Albert county, is situated 11½ miles west of Cape Enragé, forming the western extremity of Salisbury Bay an indentation of the Albert coast of the Bay of Fundy. Spring tides rise 37 feet, neaps 30 feet.

A breakwater 215 feet long, 31 feet wide on top and 43 feet high at the outer end, was built in this cove by the Federal Government in 1873, at a cost of \$13,113.45. The inside face of the work is of square timber, while the outside, strongly battered, is of round timber close-fendered. Founded on a reef under the lee of Mathew's Head and directed towards Owl's Head, the work trending towards the land lies in the general direction of southwest waves and affords, during storms, some slight protection from under-tow to small craft, if beached in the extreme angle of the cove.

The cove is noted for good holding-ground and is one of the two places on the New Brunswick coast of the Bay of Fundy, east of St. John, considered to present natural features favourable for the construction of a harbour of refuge.

The vessels carrying deals from Alma to the United Kingdom, anchor off this breakwater to receive cargoes by lighter. Alma, two miles distant is the terminus of the Albert Southern railway.

During the year 1896-97, works of repair were carried out, on the upper works of this breakwater, generally decayed from age. The cribwork break extending the whole length of the work was removed and rebuilt, while the decayed part of the close fendering was almost entirely replaced by sound material. The expenditure amounted to \$990.75.

During 1897-98, the work performed consisted in placing five rows of new floor stringers, each row extending for 200 feet; in laying about 18,000 feet B.M. of new covering on the top of the breakwater; in renewing the cap-timber, 12 inches square, for a distance of 160 feet; in placing 15 new fenders, varying from 13 to 30 feet in length, against the side of the work; and in completing the repairs to the close-sheathing of the seaward face by the addition of 51 pieces, five to nine feet long. Eighty-two yards of rock were also blasted from a reef which prevented vessels from coming along-side the work. The expenditure was \$500.

Total expenditure to 30th June 1900 is \$14,603.70.

## HILLSBORO'.

Hillsboro', Albert County, is on the west bank of the Peticodiac River, about 14 miles below Moncton.

In 1874 the Department built a small pier, 130 feet in length for the protection of shipping.

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During the year 1885 the work was raised 4 feet, re-ballasted, covered with new 3-inch planking, and the outer end, and 20 feet on each side, close fendered. No important repairs have been made on this breakwater since 1885. Total expenditure to 30th June, 1900, is \$3,749.06.

## HOPEWELL CAPE.

Hopewell Cape, in Albert County, near the mouth of the Petitcodiac River, and at the head of deep water navigation, is one of the several works on that stream intended for the convenience of shipping. For the use of vessels proceeding to Moncton, Hillsborough, and Dorchester for cargoes, the department in 1883 began the construction of a ballast wharf of round crib-work, 300 feet in length and 22 feet wide, which was completed in the following year. In 1885, the work was extended to the present length of 583 ft. by an addition built of square timber. The covering, stringers, and other upper timbers having become decayed, preparations were made (the appropriation being very small) for repairing the work, by the purchase of materials. By the end of the year a part of the timber had been delivered. Repairs were completed during the following year.

This work was transferred to control of Department of Marine and Fisheries on 13th April, 1886.

Total expenditure to 30th June, 1900, is \$9,242.19.

## KINGSTON.

Kingston, Kent County, is situated on the Richibucto River, 3 miles south of Richibucto, the shire town, and 6 miles from the mouth of the river, which enters the Strait of Northumberland.

The river above Kingston being poorly provided with shipping facilities, a contract was entered into in May, 1890, for the construction of a wharf on the upper side of the Kingston bridge, to provide additional accommodation and a means of warping vessels through the "draw." The work is 200 feet long and 35 feet wide on top, the ends and outer or north face, being built close faced of square timber, and the inner or south side open faced, both sides and ends having a slope of 1 in 18. It is connected with the public road bridge by an approach 63 feet long (measured along its centre) and 20 feet wide, built of round logs, open cribwork, ballasted, with floor stringers and planked over, the whole having been completed on the 1st December, 1891.

No important repairs have been made to this wharf since 1892.

Total expenditure to 30th June 1900 is \$4,397.15.

This wharf was transferred to control of Department of Marine & Fisheries on 22nd, December 1896.

## LAMEQUE.

Lameque is a post settlement in Gloucester Co. on Shippegan Island and  $3\frac{1}{2}$  miles from Shippegan.

A contract was let during the year for the construction of a block and span wharf, 990 feet in total length.

Work had not been started at the end of the fiscal year, but the contractor expected to begin operations in September.

Total expenditure to 30th June 1900, is \$114.63.

## L'ETANG.

L'Etang, in the County of Charlotte, is one of the best harbours on the coast of New Brunswick, and according to the Admiralty Sailing Directions, one of the

most convenient in North America, in point of entrance, capacity, shelter, depth and holding ground. The harbour is famous for sardines, and close beside a small provincial government wharf, a cannery, for the purpose of preserving the fish, has been erected, the output of which is expected to be worth from \$50,000 to \$75,000 annually. Since spring tides rise  $23\frac{1}{2}$  feet, the provincial government wharf, only 12 feet in height at the outer end, was of course dry at low water. Greater depth being necessary to allow shipment of the cases of sardines, a sum of \$400 was allowed by the department towards procuring the depth (20 feet at H. W.) required by the vessels engaged in carrying the output of the factory. During the month of June 1900, a block of round crib-work, made of small timber, 30 feet long, 20 feet wide, and 15 feet high, standing in 20 feet at H. W. was built, but not completed, at a distance of 110 feet from the end of the old wharf. With a small grant from the provincial government, an approach of trestle bents was made to the new block, which is still unfinished, the sum granted being quite insufficient to carry out a suitable extension in the depth required by this industry.

Total expenditure to 30th June 1900, is \$388.84.

#### LETITE.

At Letite, situated in Charlotte Co., is a minor channel or passage from the Bay of Fundy into Passamaquoddy Bay, where the provincial government recently built, at a fishing settlement 9 miles from St. George, for convenience of the traffic of the neighbourhood, a slightly constructed wharf at which a small local steamer touches. To make an addition to the pier-head, \$500 (a sum insufficient for the purpose) was utilized, as far as was found practicable by the end of the fiscal year, in purchasing timber and iron.

Total expenditure to 30th June 1900, is \$313.65.

#### LINCOLN.

Lincoln Wharf.—During 1892, a wharf was built at Lincoln, Sunbury County, situated about 9 miles below Fredericton on the south-western side of the river. It is constructed of round and square timber, built in the shape of an L, and is of the following dimensions: 95 feet long, 19 feet wide on top over the inner 55 feet, and  $55\frac{1}{2}$  feet wide over the outer 40 feet. The upper face is built sloping and sheathed, the outer or river face plumb, partly open cribwork and partly close faced and the remaining faces of open cribwork. The work is filled with ballast and the outer portion of the L planked over, the inner portion being finished with earth and gravel on top, the cost to the Department being \$500.

No important repairs have been made on this wharf since 1893.

Total expenditure to 30th June, 1900, is \$1,499.62.

#### MAIN RIVER.

Main River is situated in Kent County, about 12 miles above Richibucto on the river of the same name.

The construction of a new wharf was begun early in 1900.

This work, 150 feet in length and 30 feet wide, is composed of round crib-work in two blocks, respectively 45 and 75 feet long, with an intervening span of 30 ft. The face gives 11 ft. at L.W. By the end of June, this new wharf had been brought up to 16 tiers of longitudinals and cross-ties in height. All the stringers had beside been laid, and a length of 45 feet of wharf had been covered with planking. Twenty-one fenders and two mooring-posts had also been placed in position, and the approach (54 feet long) from the main road had besides been completed.

Total expenditure to 30th June, 1900, is \$2,448.66.

## MCGOWANS.

Assistance was given by the Department in 1898-9, towards the payment for two wharfs built by the Provincial Government of New Brunswick at McGowans, in Sunbury County.

These high and low level wharfs are 85 feet long in the face and built in the usual style of tidal wharfs.

Total expenditure to 30th June, 1900, is \$445.27.

## MISPEC.

At Mispec, St. John County, eight miles east of St. John, to shelter the upper end of a narrow cove which receives the discharge of Mispec River, a breakwater of square cribwork strongly battered on the seaward side, 197 feet long, 25 feet in mean width, and 30 feet high at the outer end, was built by the department in 1885. Repairs were made in 1889-90 to the seaward face, and again in 1892-3. The total expenditure up to 1898 amounted to \$10,289.16, which may be subdivided into \$9,567.71 chargeable to 'Construction and Improvements,' and \$721.45 to 'Repairs.'

In consequence of the establishment of a pulp mill at this place, repairs to the work were begun in 1898-9, when a sum of \$300 was expended in replacing seven tiers of the face for a distance of 74 feet along the work with heavy birch timbers 16 inches square, secured by screw bolts; in procuring materials, and in ballasting the work.

Spring tides rise about 26 feet. The work is dry at low water.

Total expenditure to 30th June, 1900, is \$11,089.16.

## MIZZONETTE.

This work, nine miles east of Grande Anse, Gloucester county, was built by the department in 1889 on the southern shore of Mizzonette (Maisonnette) Point, and inside Caraquette harbour for a local boat landing. The wharf, 12 feet wide on top, and 500 feet in total length, is constructed of round timber in the form of blocks and spans of 12 and 20 feet respectively. The head, also of round timber, is 20 feet square and stands in about two feet at low water. Spring tides rise six feet.

For an unimportant boat landing, this work, already becoming worm-eaten, is very long, and since there appears to be the same depth of water at a point 300 feet distant from the shore, as was found at the outer end, it is proposed to shorten the work and reduce the cost of maintenance. To this end, a cribwork block 17 feet long, 12 feet wide, and 10 feet high, was built during 1897-98 with the object of forming a new pier head; the covering between the new block and the shore was also repaired in places and the approach restored. The expenditure incurred amounted to \$249.75.

Total expenditure to 30th June 1900, is \$2,224.54.

## MOSS GLEN.

Moss Glen, King's County, is situated on the northern side of Kennebecasis Bay, about 10 miles from its entrance, the entrance being 5 miles from the mouth of the river.

During the latter part of the year 1890, a wharf at this place which was originally 160 feet long and 22 wide, was raised from 3 to 6 feet, ballasted, fendered and otherwise repaired, and a block 22 feet long on the face with an average width of about 25 feet was built at its outer end forming an L. The work is of round logs open cribwork, filled with ballast and gravelled on top. The total

expenditure was \$402.06, of this the department contributed the sum of \$200 and the local government a like amount.

In 1895 considerable dredging was done to make a channel drawing 6 to 10 feet of water 45 to 60 feet wide and about 700 long.

No expenditure has been incurred since 1895.

Total expenditure to 30th June 1900 is \$1,768.83.

#### NEGROPOINT (ST. JOHN HARBOUR).

Negropoint is a headland about sixty feet above high water mark, at the western entrance to St. John Harbour, which is formed by the estuary of the River St. John on the northern side of the Bay of Fundy, and situated in the County of St. John.

Spring tides rise 25.3 feet : neaps 20.

In addition to convenience of position for distribution by rail of cargoes landed at the city of St. John, St. John harbour is remarkable principally for great tidal range and for consequent freedom from ice in the winter months. The harbour is open, broadly speaking, from south-east to south-west, but southerly waves are broken by Partridge Island, and south-west waves are mitigated by Negropoint breakwater, while the foul ground, a shoal tailing down from the peninsula on which the city is built, must have more or less effect in moderating the force of south-easterly seas rolling around Mispec Point.

By Partridge Island, a rocky eminence devoted to quarantine and lighthouse purposes, the entrance of St. John harbour is divided into east and west channels. In the former or main channel a minimum navigable depth of 19 feet is found on the bar at low water ordinary spring tides. Two hundred yards inside the crest of the bar, a depth of 5 fathoms is found in the narrow fairway, while higher up and between the principal wharfs on either side of the harbour (450 yards broad at that point) 12 fathoms are given in mid channel. The west channel, 10 to 14 feet deep at low water, and originally 1,200 yards wide, has been contracted by the Negropoint breakwater extending 2,200 feet in a S. E. by S. direction from the headland, so styled.

The official reasons for undertaking this work are thus stated in the reports of the Minister of Public Works for 1875 and 1882 :—

" 1875. This breakwater extends south easterly from Negropoint at the western entrance of St. John. When completed, it will extent a distance of 2,250 feet, closing up the west channel to that extent, leaving, however, a width of 1,100 feet between the outer end and Partridge Island. The object is to break the force of the seas which roll into the harbour of St. John during the south-west gales in the Bay of Fundy, and which render it dangerous and almost impossible at such times for vessels to make the harbour."

" 1882. South-westerly winds threw in a heavy sea through the western channel which rendered it difficult for vessels to make the harbour, as they were in danger of being carried on the foul ground on the eastern side of the channel. In the spring of 1875 a breakwater 2,250 feet long, to partially close the western channel, was begun and in September, 1877, completed."

Reference to the chart will show that as long as the present opening remains, the object of the breakwater has been only partially fulfilled. In dealing with reduction of the bar, a more cogent reason than improvement of shelter may be found for the extension of the work to Fartridge Island.

The breakwater consisted at first of a cribwork core, 30 feet wide at the base and 15 feet wide at the top (5 feet above high water ordinary spring tides), protected on both sides by stones sloping to seaward at the rate of two horizontal to one vertical, and landward at the rate of one to one. In the month of February 1879, 1,300 lineal feet of cribwork had been swept away to a depth varying between 13 and 19 feet from the top, the stones having been raked down



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by wave action to a slope more nearly approaching the angle of repose of the material. In 1880, temporary repairs were made, and in 1881 a contract, completed six years afterwards, was entered into whereby the lost cribwork was replaced by heavy stones and the seaward slope made three to one. Even this flatter inclination proved too steep for stability: consequently, notwithstanding their size, the stones, though smoothly laid, were soon displaced by the sea. A length of fifty feet of the breakwater, extending at full height beyond a masonry pier built under the same contract to support a beacon, was also swept away. From 1891 to 1894 desultory repairs were made by the addition of large stones, chiefly deposited about the end to prevent the lighthouse from being undermined.

In May and June 1895, four large blocks of concrete were placed for the same purpose in front of the pier at its base. In 1895-96, seven concrete blocks founded at about the level of low water neaps, were built *in situ* around a quadrant of the outer end, to receive the foot of a slope proposed to be laid of heavy granite blocks inclined 4 to 1. The blocks were 59 to 91 tons each, all but the heaviest being laid in one tide. The granite pier was also reinforced by a semi-circular skin of concrete 7 feet in average thickness and strongly battered, placed around the front and brought to the level of high water springs. The footing blocks were 15 feet long, 12 feet wide, and unless varied for the sake of foundation, 3 feet high in the face, sloping upward at the rate of 4 to 1 on the top. Each block was free to settle independently, but all were keyed together by splayed concrete joggles. Inside part of the space within the quadrant, stones of the original work added to the small granite were collected and grouted as far as funds permitted, in default of the heavy granite (which will require special plant) necessary for the slopes of this breakwater; but weight is the great desideratum.

Pending consideration of works necessary for deepening the entrance to the harbour, which might possibly involve the extension of the breakwater, nothing more was done during the year 1896-97 than appeared requisite to protect the unfinished superstructure just begun, and to preserve the lighthouse, except the completion of a break at the shore end.

To this end, fifteen blocks of concrete forming aprons, were laid in position at the outer end of the work between October 1896 and June 1897. A quantity of stone which had been swept around the point of the breakwater from the seaward to the harbour side was also replaced in position. Some of this stone was laid outside the heavy footing-blocks built in the previous year and some applied to restoration of the crest of the work at the back of the lighthouse. Breaches carried below the level of high water have been made by the sea at five or six points in the rubble mound between the lighthouse and the shore. An illustration of the violence of the seas which break against the Negropoint breakwater is afforded by the removal of a 5 ton stone a distance of 76 feet in one winter. A marine dynamometer secured to the masonry of the lighthouse records the wave-force at 4,000 pounds and upwards per square foot.

In order to retain along the seaward face of the work, for natural protection, the littoral drift formerly swept by the waves over the top into the harbour, a break of piles, brush, stone and timber 270 feet long, 8 feet wide and 4 feet high, begun in 1895, was completed in 1896-7 and was also extended 140 feet along the timber work during that year with good effect. As a result of the construction of the break, the foreshore has advanced seaward, while the beach has increased in height and in breadth.

A general accretion of the beach has taken place. In addition, a tongue of drift observed after the erection of the break, when near the shore, has at the foot of the talus on the seaward side travelled 200 yards or more towards the end of the breakwater. The formation of this spit, generally 10 feet wide and 2 feet high, against the work, indicates that the drifting sand, gravel, shingle, etc., which formerly went over the breakwater into the harbour, will in time afford

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important natural protection to the work and will reduce the length of the face to be maintained.

During the year 1897-98, as a measure of precaution, 152 yards of granite were obtained and deposited about the lighthouse for protection during the winter, while stones, previously removed by the sea, were replaced in position.

The advance of the foreshore rendered necessary in that year the extension of the timber break, which was carried a distance of 80 feet farther along the top of the breakwater. A small groyne was also built for the purpose of obtaining some information as to the extent of the littoral drift near the shore end. To preserve the timber, the tops of the piles and the knees of the break were given two coats of pitch.

One thousand and nineteen cubic yards of granite were supplied and laid in place in 1898-99; while 285 yards of the original stone of the work, displaced by the sea, were restored to position.

During 1899-1900, 414 cubic yards of granite were delivered and placed around the light-house. Six hundred and six cubic yards of stone, displaced by the sea, were restored to position. Five concrete blocks containing 52.1 cubic yards were also made in place.

Total expenditure on Negro Point and Fort Dufferin to 30th June 1900 is \$486,627.46.

#### NEGUAC.

Neguac, Northumberland County, is situated near the northern entrance to Miramichi Bay, about 35 miles east from Newcastle, and some 20 miles south from Tracadie. Having good and safe shelter for boats and small vessels, and being in the centre of one of the best fishing grounds in the Gulf of St. Lawrence, and the district possessing excellent soil, an extensive business is carried on from the place, principally by water. A steamer of the Miramichi Steam Navigation Company, during the season of navigation, makes daily trips between Neguac, Chatham, Newcastle and other points on the bay and river.

The shipping facilities at Neguac consisted of an isolated crib-work block, built about the year 1888 by the steam navigation company, assisted by the local government, to and from which access was gained by a plank walk, supported on trestles, necessitating the carrying of all freight by hand or boating it to the steamer or other vessel calling for cargo. To better accommodate the large business, a contract was entered into on April 14, 1892, for the construction of a public wharf, consisting of a shore abutment 370 feet long, nineteen "blocks" 20 feet each, and an outer block or landing pier 40 x 62 feet, making in all a length of 1,190 feet. Work was commenced July, 1892, and carried on from time to time up to 11th November, when it was discontinued until spring.

During the fiscal year 1893 progress was made in the construction of this wharf, and it was brought to a satisfactory completion on 30th May, 1894.

No important repairs have been made on this wharf since 1894.

Total expenditure to 30th June 1900 is \$8,076.56.

This wharf was transferred to control of Department of Marine & Fisheries on 27th May 1897.

#### NEWCASTLE.

During the year 1898-9, certificate was given for payment of the following sum as contribution towards the provincial government wharf at Newcastle, 57 feet long in the face, on Grand Lake in Queen's, \$340.20. The face of this work is eighty-five feet long.

Total expenditure to 30th June 1900 is \$340.20.

## OROMOCTO.

During the year 1898-9, certificate was given for payment of the following sum as contribution towards the Provincial Government wharf at Oromocto, Sunbury County, 12 miles below Fredericton, \$208.23.

Total expenditure to 30th June, 1900, is \$208.23.

## PARTRIDGE ISLAND.

Partridge Island is a rocky eminence standing at the mouth of St. John harbour and dividing the entrance into east and west channels. The island is devoted to quarantine and lighthouse purposes.

At the northern end of Partridge Island two narrow piers of cribwork give shelter to the boat landing of the station. Between them a substantial block of cribwork 50 feet long and 22 feet wide, begun and nearly finished in 1896-7 as a foundation for the disinfecting house, was completed in the succeeding year; a boat slip, intended for use at low stages of the tide was partially built and a new mooring post put in and minor repairs made at the end of the west pier.

The expenditure for the year ended 30th June, 1898, amounted to \$676.69.

Total expenditure to 30th June, 1900, is \$6,955.52.

## POINT DU CHENE (SHEDIAC).

Point du Chene (Shediac) is situated in Westmoreland County. In a bight formed by an abrupt easterly trend of a coast line north and south in general direction, is a natural harbour giving about 14 feet at low water or 18 feet at high water spring tides. This place, in Westmoreland county, 40 miles south of Richibucto and about the same distance west of Cape Tormentine, is a station of the Intercolonial Railway, a point of steam communication with Prince Edward Island, and a deal port.

To protect the Intercolonial Railway pier at Point du Chene in Shediac harbour, a work weakened by the teredo, the department built in 1875 a detached breakwater 600 feet in length. Four years later the outer end of the breakwater was connected with the head of the railway pier by a wharf 205 feet long intended for the reception of ballast discharged by deal vessels. In 1881, another independent breakwater, similar to the first, and of the same length, was built to protect the shore end of the railway pier.

The breakwater built in 1875 having become worm-eaten, notwithstanding repairs made in 1883-4 and 1888-9, was destroyed by a storm in 1891. In 1893 a contract was made for reconstruction, and by the end of the following year the work was completed. The new breakwater proper is 600 feet long and generally 27 feet wide at the base, sloping at the rate of one to one from low water to 6 feet above high water spring tides. At the northern end, connection was made with the damaged ballast wharf by an additional length of 40 feet of similar work. The outside faces and cross-ties of the substructure are creosoted timber, protected by close piles and by fender piles, also creosoted. The remaining timbers and also the superstructure are untreated wood.

In 1896, the close-piling of the ballast wharf having been cut off by the teredo, repairs to the face, 183 feet long, were undertaken. In order to remove weight from the worm-eaten block, the superstructure was supported at the face on creosoted piles, and in the body of the work by untreated hardwood piles driven through it. This new top, 20 feet wide and 8 feet high, was faced with square timber, ballasted and well braced with short piles driven into the ship's ballast deposited behind the cribwork.

In 1898-99, the sum of \$33 was applied to bolting 23 fenders which had started from the face of the work. In the past fiscal year, 7 fenders, split and

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chafed by the surging of a vessel during a storm, were retopped; while 36 bridles in all were placed between the whole of the fenders along the face.

Total expenditure to 30th June 1900, is \$80,670.31.

#### QUACO.

Quaco, St. John County, is on the northern coast of the Bay of Fundy, about 30 miles to the north-eastward of the entrance to St. John harbour. The bay is semi-circular and lies open to the south-east between Quaco Head and Macomber Point, some two miles apart; its depth from a straight line drawn between these two points being about a mile. A small river discharges into the eastern end of the bay near its mouth, and a harbour of refuge has been formed there by the construction of breakwaters, each 300 feet in length, one on each side of the mouth. The harbour is dry at low tide, and only accessible for coasting vessels and schooners which come to load timber, etc., or to seek shelter for about six hours during each tide. Spring tides rise about 30 feet, and neaps 23 feet.

The west breakwater which had been damaged by storms for a distance of 149 feet, the sheathing and several longitudinals of the sloping outside face being stripped off and a quantity of ballast washed out, was repaired during the year ended 30th June, 1897; besides which the east breakwater was protected by brush and stone placed along the foot of the cribwork to prevent scour from the fresh water stream.

On the western breakwater the longitudinal face-timbers of the damaged part were generally renewed with birch, 14 inches square, and secured, where possible, with screw bolts. The stone washed out was replaced, and some additional ballasting done. The face was also covered with new sheathing for the distance mentioned, two fenders were renewed and a ladder placed near the shore end. Thirteen new fenders were also placed on the east pier, and the decayed tops of five others replaced by sound material. Small repairs were made to the covering and sheathing, and another ladder placed against that work. The expenditure in 1896-97 amounted to \$1,377.51.

In 1897-98, by the striking of a schooner, the corner fenders and sheathing of the west pier were started from their position. The damage thus done was repaired by an expenditure of \$50 applied to closing a small opening and strapping the angle,

Total expenditure to June 30th, 1900, is \$37,900.37.

This wharf was transferred to control of Department of Marine and Fisheries on 21st June, 1892.

#### RAM PASTURE NECK.

This place, in Westmoreland county, is situated near the western boundary of the "Great Tantramar Marsh" and village of Sackville. The Tantramar River at this point is very crooked and two of its bends approach within 100 feet of each other, the dividing strip of marsh being known as the "Ram Pasture Neck." As the water at high spring tides was found to pass over this, it appeared probable that in time the river would form a new channel and so be diverted from its course past the wharfs at Sackville, rendering them and the branch line of railway connecting with the Intercolonial useless.

To prevent this, the department, in 1875, at an expenditure of \$900, constructed a brush breakwater or breastwork 600 feet in length to fill in and protect the lower and most exposed portion of the "Neck." This work was raised and repaired in 1880, lengthened 265 feet, and its western end connected by a dyke 600 feet in length, with the end of the dyke surrounding the portion of marsh lying to the westward and known as the "Ram Pasture Marsh."

The action of the river has since entirely carried away 200 feet of the breast-

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work and seriously injured a further length of 365 feet and destroyed the 100 feet of dyking connecting with the Ram Pasture dyke, allowing the water at high tides to pass over the neck, and the reconstruction and repair of the works having become necessary, these were effected during the past fiscal year and 120 feet in length added. The work built is of a substantial nature, more so than that first constructed, and as its outer side, where exposed, is protected by a plank slope, it will likely prove effective for some years.

The sum expended has been \$2,000.

No important repairs have been made to this work since 1893.

Total expenditure to 30th June 1900 is \$4,050.

## RICHIBUCTO.

Richibucto harbour, Kent County, is a deal port on Northumberland Strait and a terminus of the Kent Northern railway, 38 miles south of Miramichi and about the same distance north of Shediac, is formed by the mouth of a river which is tidal for 22 miles.

At the entrance, and generally to a little above the tow (3 miles from the sea), the Richibucto may be considered to be half a mile broad and to give a ruling depth of 4 fathoms in a chanuel 250 yards wide. The river discharges into the sea between two long sandy beaches overgrown with bent grass. These beaches, which represent the effect of the littoral drift brought down an extensive sandy coast by the preponderance of northerly gales and currents, would entirely close the harbour but for the scour of the river. Through the shoal flats formed by the passage of the northerly drift, three openings, known as the North, Albion, and South channels, are found. The best gives about 9½ feet at L. W. S. T., or at H. W. S. T. 4 feet more. On the flats constituting the bar, many vessels have been wrecked. The works originally proposed for the improvement of the harbour were two breakwaters, one to extend from the southern point of the north beach in a south-easterly direction 1,200 feet, and the other to run in a north-easterly direction from the south beach, the object being to confine the water in one permanent channel, and so scour the bar. In February 1873, the north pier was begun, and by September 1874 had been constructed for a distance of 1,200 feet. In 1876, it was found that the sea during easterly storms followed the inside of the breakwater, swirled around the upper end, and endangered the beach. From 1880 to 1882 protection works were extended westward along the face of the beach to prevent erosion. Extension in the same direction was continued in 1888 for 200 feet, in 1889 for 300 feet, in 1890 for 94 feet, and in 1891 for 140 feet. The whole works are now 2,158 feet in length, and are composed principally of brush, stone, and piling. No pier has yet been started from the south beach, and consequently no increase of the depth on the bar has yet been effected. Without dredging, but including an allowance of \$13,000 for tug service, made while the works were in progress between 1871 and 1875, the total expenditure at Richibucto up to June the 30th 1899 amounted to \$73,479.37.

The works have suffered much from decay, from the sea, and from ice action. During the year 1898-99, repairs were undertaken and reconstruction of a part 238 feet long was nearly completed by the end of June, while repairs to the adjacent part 593 feet long, including raising the structure 3 feet, were also nearly finished.

In detail, the repairs consisted in replacing missing face-timbers: in refilling with ballast; in strengthening the old work by driving two extra piles at each bent; in capping all, in bracing some, of the bents; and in raising the whole 3 feet higher by means of a solid timber break, in order to prevent erosion of the beach by the waves which formerly mounted the top of the work. In this part of the work, 64 new face-timbers, each 17 feet long, were inserted; 77 new piles

were driven - 75 caps applied : as many knees placed ; 31 bents braced ; and a quantity of stone was placed in the work. Twenty-two old piles were also redriven.

The break extends four tiers in height for the whole distance of 593 feet. In the reconstructed part, the work was made of much more substantial character than before. Thirty bents of 3 piles each and as many of 2 piles each were driven, braced, and faced with 10 tiers of 10 inch hemlock, spaced 4 inches apart by means of chocks. The new bents are 15 feet broad and are carried to the same height as the adjacent new break, viz., 7<sup>1</sup>/<sub>2</sub> feet above H. W. S. T., and for the same reason. From the upper end of the beach protection, a groyne 59 feet long, composed of stakes, brush, and stone, was built to intercept the sand drift.

In 1899-1900, the repairs of the inner part of the north pier were completed: a groyne, 33 feet long and 15 feet wide, made of a brush mattress, piles and large stone, was built ; and another groyne 33 ft. long was rebuilt outside. Two brush groynes, 191 feet in total length were built inside ; while a new breastwork, 470 long and 8<sup>1</sup>/<sub>2</sub> feet wide, composed of pile framework sheated on the outside and filled with brush and stone, was constructed on the seaward of the beach with the object of intercepting the drifting sand, and preventing erosion. In this, the work has been eminently successful.

Total expenditure to 30th June, 1900, is \$77,461.64.

#### RIVER ST. JOHN AND TRIBUTARIES.

The River St. John proper, 450 miles long, takes its rise from sources in the province of Quebec and State of Maine, at a reputed maximum altitude of 2,159 feet above the sea level. Entering New Brunswick at the confluence of the St. Francis, a little below the borders of Quebec, it continues to be the international boundary almost to Grand Falls, and after flowing through the province for nearly 300 miles (by way of the counties of Madawaska, Victoria, Carleton, York, St. Aubury, Kings's and Quecu's) discharges into the Bay of Fundy at St. John. Many tributaries, some being of considerable magnitude, are received by the main stream. Among them are the St. Francis, Madawaska, Green River, Grand River, Salmon River, Aroostock, Tobique, Presqu'Île, Maduxikeag, Eel River, Nackawick, Keswick, Nashwaak, Oromocto, Jemseg (Grand Lake), Washedomoak, Belleisle, and Kennebecasis. Except the last five, which are slightly tidal for some distance, they are fresh water streams.

The total basin from source to mouth is computed to be 26,000 square miles, an area almost equal to the whole of New Brunswick, but as a part of the water shed lies outside, only a little more than one-half the province is drained by the river. The St. John is considered navigable for vessels 15 feet in draught for a distance of more than 50 miles from the mouth, but no positive information on this point has yet been obtained. About 8 feet at low water can be carried to Fredericton, 84 miles from the sea and 6 miles below the head of tide at Springhill. Three natural features of the river are remarkable, viz., The tidal falls, Grand Fall, and the annual floods. Although in summer the fresh water stream between Woodstock and Fredericton is in places 400 to 1,000 feet wide, expanding at the latter place after reaching tide-level to half a mile in breadth ; yet the actual mouth of the river, a rocky gorge 400 yards long, immediately at the head of St. John harbour measures but as many feet across at high water. Here at low water the level of the river water is from 11 to 15 feet above the sea, and as the ordinary tides flow from 23 to 27 feet, the sea level at high water is from 8 to 13 feet higher than the waters of the river. Thus there are two falls at every tide, viz : one outward and one inward, and vessels can only pass when the waters of the ocean and river are on a level. This occurs only for the space of about 10 minutes during each ebb and flow of the tide ; at all other times it is either impassable or extremely dangerous.

At Grand Falls, 223 miles from the sea, the whole volume of the river plunges over an almost perpendicular face of limestone 60 feet high, into a deep ravine 250 feet across, somewhat similar to the narrow pass at St. John. Flanked for nearly a mile by lofty rugged cliffs, the confined current dashes from the foot of the falls with excessive strength, mining deep pot-holes in the rocky bottom of the channel in the course of a farther descent estimated to be slightly less than the first. In the harbour of St. John, ordinary spring tides are considered to rise  $25\frac{1}{4}$  feet. At the wharfs of the river steamers, a mile above the falls, while summer range is but 3 feet, the highest flood mark is given as 17 feet above extreme low water. At Oromocto, 73 miles from the sea, where the tidal range is 10 to 12 inches, the flood of 1887 reached a bridge 20 feet above low water. At Andover, 200 miles from the sea, floods attain an elevation of more than 27 feet above summer level. By contrast, the Tobique and St. Francis swell 9 and 6 feet respectively. After the first spate due to the melting of the snow in the catchment basins of the Kennebecasis, Belleisle Bay, and Washademoak, a secondary flood occurs, caused by the back water of the main river, which is fed from sources farther north, and consequently later in thawing.

The harbour of St. John is open all the year round, but the ice bound from November to April, an average period of 144 days. The water usually begins to rise in April, reaching flood pitch early in May, and maintaining a high level for two or three weeks. The ice run takes place before the time of highest water. By the middle or end of July the water has fallen to summer level, a stage lasting with some variations dependent upon the rain fall, for about 60 or 70 days.

In addition to a little coal, a considerable quantity of cordwood, and the ordinary food supplies yielded by the farms of a lengthy fertile valley, the trade of the river comprehends an abundance of valuable timber, fluctuating each season in amount, but generally at least equal to 135 million superficial feet annually. Most of the logs are floated loose down the tributaries and upper river to Fredericton, some being manufactured there and shipped coastwise or to the United States. The remainder, or major part, is towed from the provincial capital to St. John in rafts, giving employment to a fleet of tugs.

For the purpose of works, three divisions may be made of the river :

1. Tidal navigation for steamers and sailing vessels, between St. John and Fredericton, 84 miles, requiring 11 feet at low water. Principal obstructions : the Oromocto shoals, about  $1\frac{1}{2}$  mile ; the middle ground above Oromocto Island, about 1 mile ; and the shoals abreast Fredericton, rather more than  $\frac{1}{2}$  mile in length. The last are now dredged, but the other obstacles remain.

2. Inland navigation from Fredericton to Woodstock, a distance of about 65 miles, requiring  $3\frac{1}{2}$  feet at low water. The obstacles to inland navigation, besides boulders in some places and perhaps bed rock at Meductic, are shoals of material more or less coarse, according to the strength of the current varying in composition from sandy gravel to stones. The chief bars are at Springhill and Bear Island ; while Knapp's, Perley's, Coac, Nackawick, Belvisor, Moore's, Bett's Dibblee's, and Bedell's Bars, with Meductic Rapids, constitute, according to present information, lesser obstructions. Dividing above Springhill into two main channels, and from a general width of 350 yards, opening to a stretch of  $1\frac{1}{2}$  miles between banks, with a waterway increased by at least one-third, the river becomes dotted with eyots and shallows. Two gravel shoals, known as the Russel and Chapel Bars, together about  $\frac{1}{2}$  mile in length, compose the obstacle at Springhill. At Bear Island, 25 miles above Fredericton, in consequence of another division of the river into three channels aggregating 600 yards in breadth, a shoal of gravel and stones, 1 mile long giving twenty-one inches at low water, has been formed. Besides dredging, a long training-dike will be necessary for the maintenance of this channel. After re-uniting below the island, the width of waterway in the single channel is only 250 yards.

3. The upper river, including with the tributaries all that part above

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Woodstock. This division is now used for the passage of timber only. On some of the tributaries beyond the reach of railways, supplies for the lumber camps are transported in tow boats, for which channels are required to be made and tow paths provided.

## INLAND NAVIGATION.

For a distance of 8 miles from Middle Southampton, the tow-paths were repaired in many places, and widened sufficiently for two horses abreast. The work done consisted in grading, blasting, clearing, and the construction of dry rubble retaining walls. The expenditure during the past year, 1899-1900, has been \$247.77.

## RIVER ST. JOHN, UPPER.

On the upper river, 59 cubic yards were removed by blasting from Rapid de Femme Rock, near Grand Falls, at an expenditure of \$300.

On the Tobique, channels aggregating 1,165 feet in total length and from 30 to 40 feet wide, were made by removing boulders, or by scraping the gravel through 12 bars. For a distance of  $3\frac{3}{4}$  miles on the right hand branch, a channel 12 feet wide for boats and logs was made by removing boulders. One hundred and eight cubic yards of rock were also blasted at Serpentine Falls, 51 miles above Plaster Rock. The expenditure for the year 1899-1900 was \$688.62.

On Green River, between second and third falls, a distance of 16 miles, boulders were removed in various places, in order to make channels, by an expenditure of \$298.98.

On the St. Francis, channels 460 feet in length, for the tow boats were made through half a dozen gravel bars. By removing boulders and rock through Horseback, DesRosières, and Cross Lake Rapids, channels were made for 1,108 feet farther.

This work was performed at a cost of \$300.

Total expenditure to 30th June 1900, exclusive of dredging, \$144,719.93.

## SCOVIL'S POINT.

During the year 1893, a wharf was constructed at Scovil's Point, situated about 44 miles above the mouth of the river and a short distance below Gagetown, the shiretown of Queen's County.

The work was built for the landing of passengers, freight, etc., and was finally completed in the spring. It is constructed principally of round timber, open cribwork and partially filled with ballast. It has a frontage on the river of 142 feet,  $17\frac{1}{2}$  feet having a width of 37 feet on top, and the balance an average width of about 18 feet. There is a depth of from 6 to 10 feet along the face at low water summer level. The department's contribution towards the construction of this work was \$500.

No important repairs have been made on this work since 1893.

Total expenditure to 30th June, 1900, is \$2,000.

## SEWELL.

During the year 1898-99, certificate was given for payment of the following sum as contribution towards the provincial government wharf at Sewell, on the Main River, St. John, fifty-four feet long in the face, in four feet at low water, 1.1 miles below Fredericton, \$276.50.

Total expenditure to 30th June, 1900, is \$276.50.



ST. LOUIS

St. Louis, Kent County, is a closely built and rapidly growing village (exclusively settled by Acadian French) situated on the south bank of the Kouchibougnacis River, about 4 miles from its mouth where it enters the Gulf of St. Lawrence, and 7 miles northward from Richibucto, the shire town of the county; it is the terminus of the "Kent Northern Railway."

The Kouchibougnacis at St. Louis has a width of about 700 feet and is spanned by the highway bridge, a swing span in this admitting of the passage of vessels farther up the stream which is navigable for some miles.

To provide wharfage accommodation a contract was entered into 6th November, 1888, for the construction of a wharf 200 feet in length and 30 feet wide on top, to extend in a north-easterly direction from the outer end of the south abutment of the bridge, and was satisfactorily completed on the 21st September, 1889.

The wharf is built of round logs, open cribwork fendered on face at 10 feet centres, and after being well filled with ballast, floor stringered and planked over and has along its face a depth of 7 feet of water at low water spring tides, which here rise  $3\frac{1}{2}$  feet; neaps, 2 feet.

No important repairs have been made by this Department on this wharf since 1890.

Total expenditure to 30th of June, 1900, is \$2,075.15.

This wharf was transferred to control of Department of Marine and Fisheries, on 13th February, 1890.

ST. MARY'S.

St. Mary's Kent County, is situated on the Buctouche River, about 7 miles above the village of Buctouche.

At St. Mary's a highway bridge has been constructed across the river, and at right angles to this bridge a wharf 120 feet in length has been constructed, for the accommodation of the residents of the locality, and to enable them to ship the large quantities of lumber, hemlock bark, wood and general produce, obtained in the neighbourhood.

The wharf was completed in 1885. No important works of repair to this wharf since 1885.

Total expenditure to 30th June 1900 is \$1,714.22.

This wharf was transferred to control of Department of Marine & Fisheries on 22nd, December 1896.

ST. NICHOLAS RIVER WHARF.

St. Nicholas River wharf is situated in Kent county. The construction of a new wharf was begun in the spring, near the mouth of St. Nicholas River (a tributary of the Richibuctou), 4 or 5 miles below Main River,  $3\frac{1}{2}$  miles above King-ton, and 7 from Richibuctou.

By the end of the fiscal year, the work, consisting of 3 blocks of round cribwork, composing a block and span wharf 159 feet in total length, with a pier head  $34 \times 24$  feet, standing in about 7 feet at low water, had been brought up to the under side of the stringers, fully ballasted, and partially fendered.

Total expenditure to 30th June 1900, \$1,400.

SHIPPEGAN GULLY.

Shippegan Gully is situated in Gloucester County, fifty-six miles east of Bathurst and two miles from Shippegan, a station of the Caraquet Railway; is a passage much used by fishing craft from Baie des Chaleurs to the Gulf of St.

Lawrence, between Shippegan Island and the mainland. But for a shoal, two fathoms could be carried through this channel. The obstruction of the strait lies at the southern end and consists in a bar of littoral drift 800 yards wide, between the 12-foot contour lines, over which formerly only  $3\frac{1}{4}$  feet, but since the construction of the work undertaken by the department for the improvement of this passage nearly  $6\frac{1}{2}$  feet are found at low water, equivalent to 12.3 feet at high water spring tides.

For the fishing fleets of Shippegan, Caraquet and other parts of Baie des Chaleurs, the outlet to the gulf by way of Shippegan Gully is of the utmost importance, since it furnishes means of avoiding a long and hazardous voyage around Point Misou, besides effecting a gain of two days a week in reaching and returning from the fishing banks. The mouth of the gully (lying 16 miles north of Tracadie and about the same distance east of Caraquet) is bordered by beaches of sand in some places only a little above the level of high water spring tides. The works at Shippegan are intended to preserve and deepen the channel between the sandy beaches by which access is given for the fishing boats to the sheltered waters of Shippegan Harbour. As this channel is maintained by tidal scour, it is of the utmost importance that no other opening of any kind than the navigable waterway should occur in these beaches. Broadly speaking, the works consist of a pier at the point of each beach, and of breastworks running either continuously or intermittently along the beaches to prevent their being cut through by the sea from the outside, or by the pent-up waters of Shippegan harbour from the inside.

From 1875 to 1890, the works were confined to the east side of the gully, and consisted principally of a short pier at the point and long breastworks along the face of the beach, the whole 1,220 feet in length, one-third being of cribwork and the remainder of brush and piling. In addition a dam 890 feet long, also of pile and brush work, was built near the junction of the east beach with the land, to prevent erosion.

In October 1879, a storm, accompanied by an unusually high tide, seriously injured the dam; while the unfinished outer portion, 500 feet long, of the pier was destroyed and the inner part much damaged.

In 1880-81 and again in 1883, the dam was repaired, raised and strengthened; while in the latter year the pier was repaired and extended 120 feet.

General repairs were made again in 1883-4 also in 1886-87; while in 1888-89 an additional block of 50 feet was added to the outer end.

Until 1890-2 only one pier had been built, and therefore no material improvement of the entrance could have been effected, but at that period a pile structure, 1,104 feet long ballasted with stone, was built at the point of the western beach. At the same time, a length of 137 feet of the work built in 1875 was reconstructed. On the construction of this work scour took place in consequence of the contraction of the waterway. The beaches, however, if not all over at least in places, are liable to be cut through by the water.

In 1892-3, and also in the following year, repairs were continued.

In 1897-8 general repairs to the works were begun, and efforts were made to elevate the beaches by means of the natural forces to a height sufficient to exclude the sea, to promote the growth of bent grass, and to prevent further denudation by the strong winds of that locality.

The east pier having been breached by the sea in three places, the west pier-head having been damaged and the west beach so denuded of sand by the wind as to become completely cut through, to the danger of the channel, the extensive repairs begun in 1897 were continued until the winter of the following year. By that time the dam had been raised about 3 ft. for a distance of 452 feet, and had been extended a distance of 185 feet after a false channel 6 feet deep had been closed by a brush mattress 30 feet wide, and an apron of brush and stone 375 feet long had been applied to stop leaks in the original structure. On the northern

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side of the dam, 10 rows of stakes or handpiles were driven in such manner as to form groynes in order to give protection to the work by arresting the drift of seaweed and sand.

To prevent the traffic from wearing a cartway into a runnel and causing a false channel through the eastern beach, it became necessary to raise the beach and to confine the cartway over this elevation to a single track. An inclined roadway 12 feet wide and 60 feet in length, raised  $2\frac{1}{2}$  to 3 feet above the level of the beach, was accordingly made of brush and shingle bordered with fascines. Four hurdles, 155 feet in total length, were carried to the sand dunes on each side in order to restrict the traffic to the new way. A gap made in the sand dunes near this road was closed by a work of stakes, brush and shingle, 46 feet long, 15 feet wide and 4 feet high. Near Fruing & Co's, fishing establishment, an opening on the harbour side of the beach was closed by 24 bents of piles driven 5 feet apart, enclosing fascines, brush and stone. A further length of 119 feet was filled with brush and stone only.

A gap, originally 50 feet long, near the inner end of the east pier, was closed by driving 22 piles, to which were secured transverse caps and longitudinal walings, the whole being filled with brush and stone extending for a total distance of 63 feet. Immediately adjoining this piling, a breach in the old work 22 feet long was rebuilt with fascines, brush and stone. Three hundred and twenty-five feet from the eastern pier-head, a breach in the old work, 62 feet long and 14 feet wide, was closed with piles, brush and stone, and faced with fascines. Immediately adjoining, another gap in the old pier, 70 feet long, was closed in the same manner. In the eastern pier-head a gap 90 feet long was closed by a block of close-faced cribwork 45 feet long, and by pile and brush work of the same length  $33\frac{1}{2}$  feet wide. Some details of the pile and brush work yet remain to be finished. A block of old cribwork inside these gaps was strengthened by driving piles along the inner face connected by cross-walings and close-piling on the seaward side, the cap was renewed, and the top of the work levelled with brush and stone. The eastern pier head was protected at the angle with close-piling, and received some ballast.

On the west side of the gully, 62 piles, generally 26 feet long, were driven at the pier head; while for 180 feet the work was refilled with brush and stone. At the shore end of the west pier the covering was laid.

In order to raise the crest of the west beach and so prevent the sea from forming false channels, a brush breastwork, 1,669 feet long with hurdle groynes on each side at intervals of 40 feet, was carried from a point near the shore end of the west pier to the sand dunes. The work is intended to catch the sand when driven by the wind and to raise the beach high enough to allow bent grass to be planted, when further denudation will be arrested. Already this work has by collection of the sand begun to raise the beach along nearly the whole length. About 150 feet from the west end of the breastwork, a gap between the sand dunes, through which the sea entered, was closed with a work 43 feet long,  $17\frac{1}{2}$  feet wide, and 4  $\frac{1}{2}$  feet high, of brush, stakes and shingle.

In the past fiscal year, with the exception of placing some stakes and brush on the west beach, repairs were confined to the eastern pier. The works before left unfinished were completed by the addition of covering, fenders, sheathing and ballast: a length of 455 feet of old work was rebuilt with fascines, brush and stone; a new pile groyne 26 feet long, and another of brush and stakes, 220 feet long, were constructed; additional brush and stone were applied to levelling up the works; two fences, intended to confine the cartway to one road (to prevent destruction of the bent grass), also to act as groynes, were erected on the east beach. At the dam, a length of 492 feet was raised generally a height of 3 feet with brush and stone; an apron, 476 feet long and 8 feet wide, was added to the face; an extension of 17 feet was made, ending in a groyne 175 feet in length, and an opening in the sand dunes was closed. The effect of the works

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undertaken since 1897 has been to prevent further erosion, and to cause restoration of the beach. It is besides reported that the depth of water in the harbour entrance has consequently increased.

Total expenditure to 30th June 1900 is \$73,491.90

#### STONY CREEK.

At Stony Creek, Albert County, eight miles below Moncton, on the Petitcodiac, there is a groyne of round and square timber 290 feet long, 20 feet wide on top and 36 feet high at the outer end, which has been built by the department, 1873 to 1875; the object being to deflect the current from a reef said to be dangerous to vessels and to protect the river bank from erosion.

During the year ended 30th June, 1898, four tiers of the end were rebuilt and the corners fendered, one being sheathed and strapped. The cap-timber was also renewed for a distance of 294 feet, and fenders were placed against the sides. The work was filled with brush and stone for a distance of 140 feet and a new mooring-post was placed at the end. The expenditure was \$500.

Total expenditure to 30th June 1900, is \$12,936.50.

#### THOMPSON'S WHARF.

During the year 1898-99, certificate was given for payment of the following sum as contribution towards the Provincial Government wharf.

To the high water portion of Thompson's wharf at Hampstead in Queen's County, on the main river St. John about 33 miles from St. John \$76.10. This wharf is thirty-five feet long and stands in six feet at low water.

Total expenditure to 30th June 1900 is \$76.10.

#### TRACADIE.

Tracadie Harbour, Gloucester County, is situated on the east coast of New Brunswick, about midway between Shippegan gully and the entrance into Miramichi Bay, and is entered from the Gulf of St. Lawrence by what is known as the "north" and, "south" and "old" gullies. The harbour is some 6 miles in length, by  $\frac{1}{4}$  to one mile or more in width, but, excepting in the river channels (north and south Tracadie Rivers) and in the channels entering from the different gullies, is quite shoal being almost dry at low water spring tides.

To provide wharfage facilities for the district, which is a large and populous one, containing fully 2,000 inhabitants, a public landing pier, 1,430 feet in length, extending to the end of the channel of the "north gully" was constructed during the fiscal year 1894, the materials therefor having been obtained during 1892-93.

The work consists of a stone abutment or approach, 250 feet in length, of twenty-eight blocks, 20 by 25 feet, one block 40 by 25 feet, and 29 spans or openings of 20 feet each, which are spanned by 7 floor stringers 10 by 12 inches, the entire top of the work being covered with 3 inch planking. The blocks and the shore approach are built of round logs, open crib-work, and are fully ballasted, their sides being fendered, capped, etc., the expenditure during the year amounting to \$3,615.96.

Petty repairs were made in 1899 at an expense of \$76.19.

Total expenditure to 30th June 1900, is \$4,749.95.

This work was transferred to control of Department of Marine and Fisheries on 9th March 1897.

#### TWO RIVERS.

Two Rivers is a small cove of Chignecto Bay on the shore of the county of Albert, about 6 miles from Anderson's Hollow and the same distance from Harvey.

The work is dry at low water and the head stands in 14 feet at high water spring tide.

Under contract dated April 6, 1898, the construction of a wharf intended to facilitate the shipment of farm products, was begun on the 25th of the following month. The work consists of a pier-head 40 x 35 feet, connected by stringers crossing and opening of 20 feet with a shore block 40 feet wide and 56 feet in mean length. The whole is of round cribwork approached by a ramp 35 feet long and 25 feet wide. The expenditure to the end of the fiscal year 1898 was \$442.82.

The work was completed by December, 1898, at a total cost of \$2,237.21. A further sum of \$356.98 was expended in making beds for vessels to lie aground alongside the wharf, and in removing large boulders from the mouth of the creek.

Total expenditure to 30th June 1900, is \$2,594.19.

#### TYNEMOUTH.

Tynemouth Creek, St. John county, 21 miles east of the city of St. John, is one of the several small havens, dry at low water, found on both shores of the Bay of Fundy, which are only useful on account of the high range of tide. Tides rise here about 28 feet. Inside a beach of gravel and stones, is a tidal basin, accessible to small vessels at high water by an opening at the east end of the beach.

In 1874-75 the department built a substantial cribwork pier on the rocky foreshore of the eastern cliff to prevent vessels from taking ground on that side.

In 1882-83, another work to maintain the channel was built on the point of the beach on the opposite side.

In 1894-95, a sum of \$225 was applied in replacing some of the fenders and covering of the east pier and in removing part of a rocky ledge obstructing the channel.

In 1897-98, a sum of \$510 was expended in removing 813 cubic yards of shingle from a shoal obstructing the entrance, and in effecting minor repairs to the west pier.

Total expenditure to 30th June 1900, is \$7,233.07.

#### UPPER CARAQUET.

Bridgetown, Gloucester County, is the name of the railway station situated at the upper or western end of Caraque Harbour and Settlement, and is 2 miles east of the bridge crossing the Caraque River, and 6 miles west of the existing public wharf near Caraque church.

Directly off Bridgetown, extensive oyster beds are situated, causing this portion of Caraque Harbour to be known as the "Oyster Grounds."

To provide shelter and a landing place for boats, a contract was entered into on the 25th October, 1890, for the construction of a work 350 feet long, consisting of a shore approach 160 feet long, 4 blocks each 15 by 15 feet, 5 spans or openings of 20 feet each and an outer block 30 by 30 feet. The shore approach and the several blocks to be constructed of round logs open cribwork, the spaces or spans between each being spanned with four 10 by 12 stringers, the blocks and approach to be fendered on the sides and full ballasted, the whole being covered with 3 inch planking.

This work, which was in progress during the previous year, was completed in October, 1891, the expenditure thereon amounting to \$1,308.72.

As built, the work only extends out to extreme low water springs, although at low tide there is generally from 1 to 1½ feet of water at the end, thus giving fair accommodation to those engaged in the oyster fishery.

No important repairs have been made to this wharf since 1892.

Total expenditure to 30th June 1900 is \$1,308.72.

## UPPER SALMON RIVER.

Upper Salmon River, otherwise called Alma, the terminus of the Albert Southern Railway, is situated in the county of Albert, 5 miles from Rocher Bay, and 2 from Herring Cove. From Alma, deals are either sent in coasting vessels to St. John for trans-shipment, or directly to sea-going vessels lying at the anchorage of Grindstone Island, or in the roadstead off Herring Cove. For protection of the coasters lying at the private wharfs inside the river mouth, which afford four or five berths, the department built in 1883-84 a breakwater 26 feet in mean width, and 180 feet long. In 1886-87, this breakwater was extended to a total length of 420 feet. By position, the work lies across the path of the littoral drift. In consequence, the foreshore has advanced nearly 500 feet on the weather side, and the drift, having fully charged the outside of the breakwater, is now working around the end. Accordingly, inside the point of the breakwater, a bar 11 feet in height was formed, which extended across the mouth of the river. By means of a temporary groyne, inducing scour, the channel, which had become contracted to a width of only 34 feet, was increased during the months of April and May 1900 to 125 feet in breadth; but a middle ground 160 feet long, 45 feet wide, and about a foot above low water was left.

Total expenditure to 30th June 1900 is \$10,741.99.

## VANWART'S LANDING.

Vanwart's Landing, King's County, is situated on the western side of the river, about 30 miles from the mouth, and about 45 miles below Fredericton.

During 1892-3, a wharf 205 feet long, the inner 155 feet being 25 feet wide on top and the outer 50 feet, 62½ feet wide, was built, the ends and sides being of square timber, close faced, the interior of round logs, and the whole filled with ballast, with earth and gravel on top. The structure was completed in June, and is one of the best pieces of work on the river, the cost to the department amounting to \$500.

No important repairs were made on this wharf since 1893.

Total expenditure to 30th June 1900, \$500.00.

## WESTFIELD LANDING.

Assistance was given by the Department in 1896-7, towards the payment for a wharf built by the Provincial Government of New Brunswick at Westfield Landing in King's County.

The wharf at Westfield Landing is of the common type of those built on the St. John for the use of river steamers; being of round cribwork and covered with plank all over. It is 116 feet long over the timber work; the head which stands in 7 feet depth at low water measuring 44 feet by 30 feet.

Total expenditure to 30th June 1900 is \$338.62.

## WILSON'S BEACH.

At Wilson's Beach, a fishing settlement in a slight indentation of the coast, on the west side of Campobello, an island in the Bay of Fundy belonging to the county of Charlotte, a breakwater 373 in length was built to shelter the cove, by the joint contribution of the local and federal governments between the years 1874 and 1878. The outer arm having become dilapidated and the cove having silted up, preparations were made to repair the inner end, 248 feet in length, by day labour. Owing to the backward state of the spring, which prevented the delivery of timber, in time, no work of reconstruction had been begun by the end of the fiscal year.

Total expenditure to 30th June 1900 is \$4,124.05.

## PROVINCE OF QUEBEC.

## AGNÈS.

Agnès (Morinville), is situated at the mouth of the Chaudière River in the County of Beauce.

The construction of this wharf was commenced in 1882-3 and completed in 1884.

Total expenditure to 30th June 1900 \$7,276.20.

This wharf was transferred to control of Department of Marine and Fisheries on 27th November, 1891.

## ANSE A BEAUFILS.

During the last fiscal year the sum of \$4,911.19 was expended in continuing the retaining wall of round cribwork commenced in 1898 on west side of Anse à Beaufils river, Gaspé County, and starting a similar construction on the opposite side of the stream.

At close of fiscal year both structures were laid out some 500 feet in length from bridge on the public highway to low water with the object of keeping the sand from being blown or carried into the small harbor for fishing boats, and completely filling it up at certain times of the year.

So far the hopes that a safe harbor has been made, are beyond the general expectations.

## ANSE A L'EAU OR TADOUSSAC.

Tadoussac, the *chef-lieu* of Saguenay County, is a watering place on the north-eastern side of the Saguenay River, about 5 miles above its mouth on the estuary of the St. Lawrence, which is much frequented by tourists and health seekers during the summer season. The village contains three churches, one of which is the oldest church built in Canada, being erected in 1747, four hotels and stores, a telegraph office, a post office and many handsome villas; a fish hatchery has also been established here by the Department of Marine and Fisheries. Population of village about 900, of parish 2,440.

Some 50 years ago, or more, the ex-lumbering firm of Price Brothers & Co., of Chicoutimi, built at Anse à l'Eau, which constitutes the harbour of Tadoussac, a wharf for their own use and convenience, of round logs and slabs, and partly faced the same with square timber and ballasted the work with stone. This wharf had a total length of 366 feet and a general width of 26 feet, excepting a block at the west end which measured 4 feet by 50 feet by 29 feet in height; the depth available along its outer face at lowest water being about 7½ feet. In the absence of any other landing this wharf was not used alone by the firm who built it, but was also taken advantage of by the Richelieu Company as well as the general public.

The structure having become too delapidated to be of further service for the public, the Federal Government decided in 1888 to carry out the works of repair required, to permit of the wharf being used for general shipping and landing purposes as in previous years. Accordingly, in 1887-8 and 1888-9 the whole wharf was raised 3 feet, and a new plank floor put on throughout; a new inclined slip was also built. In 1889-90 a block, 30 x 30 x 43 feet in height, was sunk 30 ft. to the westward of the main structure, and in the following year the two works

were connected by a timber span 30 x 30 feet, and in 1893-94 a new roadway or approach to the pier from the upland, or embankment of earth, 525 ft. long by 25 feet wide was built.

The wharf, as completed in 1894, has a total length of 225 feet on the outer or channel face, and is 108 feet wide for 165 feet in length at the eastern end, and 30 feet for the remaining 60 feet at the western end.

By a deed of sale dated 10th December, 1896, Messrs Price Brothers & Co. have conveyed to the Federal Government all their right and interest to the wharf and the land on which it stands as also to the roads and approaches thereto, for the sum of one dollar; reserving, however, the right of using in perpetuity a portion of the wharf 35 x 25 feet, for the purpose of piling firewood thereon and the right of access to the wharf in perpetuity, to land or ship merchandise as they may require, whether with steamers, schooners or other craft.

During the fiscal year ended 30th June, 1897, a combined shelter and freight shed with waiting room, covering an area of 60 x 30 feet was erected close to the channel or southern side of the wharf, and this face has been sheathed with 5-inch tamarack for a length of 160 feet; moreover the hand rails on the approach have been painted. Expenditure incurred in 1896-7, \$1,474.93.

Total expenditure to 30th June, 1900, is \$14,956.06.

This work was transferred to control of Department of Marine and Fisheries on 20th July 1895.

#### ANSE AUX GASCONS.

The village of Anse aux Gascons, in the county of Bonaventure, is situated on the north shore of Baie des Chaleurs, in the municipality of Port Daniel East, 7 miles to the eastward of Port Daniel and 42 miles west of Percé. Spring tides rise 6 feet, neap tides 3 feet. The locality is considered to be one of the best fishing stations on the Baie des Chaleurs, the fleet consisting of over 60 boats in summer and 100 in the fall. The codfish catch averages from 4,000 to 5,000 quintals every season, beside which large quantities of salmon and lobsters are also obtained. The bay is entirely open to southerly gales, against which it affords no protection. In order to inclose and protect an area with sufficient depth of water at extreme low water spring tides to accommodate the largest class of fishing boats and trading vessels of moderate draught, a sum of \$5,000 was appropriated by parliament at its session of 1897 towards the construction of a breakwater 400 feet long and 20 feet wide. Tenders were called for the work, and on February 1, 1898, a contract was entered into for its construction for the bulk sum of \$11,494. The work was well under way at the close of the fiscal year 1898, when a sum of \$5,000 had been expended.

During the fiscal year 1899, the work commenced in 1898 was completed.

The structure is of close-faced cribwork, sheathed over the seaside and outer end face and ten feet on return inside corner with five-inch hardwood extending down 14 feet.

The width at bottom is 24 feet, top 20 feet, height outer end corner 23 feet 10 inches to top of cap; total length outside on cap is 436 feet 6 inches (including an extra length over contract work of 36.6 feet).

The total amount expended on construction is \$10,047.57.

#### ANSE ST. JEAN.

Anse St. Jean is situated on the south-west shore of River Saguenay, 25 miles above its mouth.

The public landing pier at this place is 366 feet long, 26 feet wide, with the



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exception of the head block, which measures 50 feet along the channel face, by 40 feet in length, and is 33 feet in height.

At low water spring tides there is a depth of  $7\frac{1}{2}$  feet at the outer end of the pier.

Ordinary spring tides rise 17 feet, neap tides 12 feet.

During the fiscal year 1899 a landing slip was built on the eastern side of the pier; the slip is 75 feet long at the base, 25 feet on top and 14 feet wide, filled with stone ballast.

The top planking of the pier has been renewed on a length of 200 feet.

The work was done by day labour at a cost of \$1,000.27.

During the past fiscal year 50 feet of the outer end was sheathed with 6 inch. tamarac. About 200 feet of planking was renewed also the planking of the inclined slip at a cost of \$501.00.

Total expenditure to 30th June 1900 is \$12,373.12.

## BAIE DES PÈRES (VILLE-MARIE).

Baie des Pères is situated on Lake Temiscamingue, where a wharf is constructed 444 feet long, 20 feet wide and 18 feet high at the outer end where the head is 30 feet wide.

The work was thoroughly repaired in 1895 at an expense of \$945.63; in 1896 \$25.65 was expended.

There is a warehouse on the pier 20 by 36 feet.

This wharf was purchased by the Dominion Government from the Lake Temiscamingue Colonization Railway Company in December, 1897 for the sum of \$3,000.00 (See O. C. 83,568; 20-12-87).

Total expenditure to 30th June, 1900, \$4,039.40.

This wharf was transferred to control of Department of Marine & Fisheries

## BAIE ST. PAUL.

The village of Baie St. Paul, in the county of Charlevoix, with a population of about 1,400, is situated on the north shore of the St. Lawrence, 60 miles east of Quebec. It is built on both sides of the River du Gouffre, which empties into a bay one mile and a quarter deep and three miles wide at its entrance. The bay is dry at low tides with the exception of some small channels. Spring tides rise 20 feet, neap tides 13 feet. In 1874-5 an isolated block 200 feet long and 25 feet wide, with a head 60 feet long and 50 feet wide, was built in 12 feet of water at low water spring tides, on the west side of the bay at a distance of 3,000 feet from shore at high tide and 600 feet at low tide. This block was built for the accommodation of lightships when taken to or removed from their mooring in the St. Lawrence, and was also used by steamers as a landing pier. But as it was not connected with the shore the accommodation it afforded to passengers and freight was so poor that it was decided to build a landing pier on the east side of the bay, at Cap aux Corbeaux, three miles from the village.

*Construction.*—During the winter of 1881-2, timber was procured for the proposed structure, which was completed in 1885, at a total cost of \$35,933.71. It was then 712 feet long, 30 feet wide, and its head stood in 7 feet of water at low water spring tides. In 1887, an earth embankment and cribwork approach was built at a total cost of \$1,170.60 to connect its shore end to the road built by the municipality. Owing, however, to the insufficient depth of water at its head the pier could not be and was not used by steamboats, and passengers and freight were still landed on the isolated block from which they had to be conveyed in row boats or scows to shore. It was therefore decided, in 1888, to add yearly to its length until a depth of about 14 feet at low water spring tides was reached.

With this end in view four extensions, aggregating 354 feet in length and 30 feet wide, were built by contract, at a total cost of \$24,512.84 including superintendence. The first extension, 60 feet in length was constructed in 1889, at a cost of \$4,867.92; the second, 94 feet in length, in 1890-1, at a cost of \$7,327.13; the third, 100 feet in length, in 1893, at a cost of \$6,372.79; and the fourth, also 109 feet in length, in 1895, at a cost of \$5,945. The depth of water at the head of the pier at low water spring tides was therefore increased from 7 feet in 1885 to 8 feet in 1889, 9 feet in 1891, 10½ feet in 1893 and 11½ feet in 1895. The pier, as it then stood, was 1066 feet long, 30 feet wide throughout, and 35 feet high at its outer end. Its top stands 4 feet above high water spring tides. It is built throughout of close-faced cribwork filled with stone ballast. The face timbers are 12 x 12 dimensions, and the cross ties and longitudinals are round logs 14 inches diameter at the small end.

In order to reach the proposed depth of 14 feet, and complete the pier in accordance with the scheme laid out in 1888, a contract was entered into in the fall of 1898 with Messrs. Viau, Lachance & Hamel to build a further extension of 145 feet in length and 50 feet wide, forming the head of the pier, the contract price being \$12,500. At the end of the fiscal year the sum of \$4,227.41 had been paid to the contractors.

During the fiscal year the work was completed.

*Repairs.*—In 1886 some minor repairs amounting to \$82.16 were effected, and in 1888 a further sum of \$35.66 was expended. In 1893 the spring thaw and rains caused an extensive land slide, which completely obstructed the road leading to the pier for a length of 200 feet. Another approach has therefore been built on the continuation of the one built in 1887 and some distance out, in order that, should another landslide occur, which is very probable, the new approach would not be interfered with. The new approach, which is 268 feet long, 15 feet wide and of an average height of 9 feet, was built of cribwork filled with stone and gravel at a cost of \$898.47.

In November, 1893, a sum of \$124.27 was expended in renewing 234 deals in the flooring of the old portion of the wharf. In 1895 general minor repairs were effected to the amount of \$378.77. In November, 1896, the approach built in 1893 was raised 2½ feet on its total length of 268 feet, 18 toises of stone ballast were placed in it, and it was covered with three-inch deals. Thirty fenders were placed on its seaward face to strengthen the work. Part of the flooring of the pier was also renewed, 300 deals being employed. These repairs were executed by day labour at a cost of \$900.42.

During the year 1897-8 the earth embankment, which constituted a portion of the approach built in 1893, was washed away and was rebuilt of cribwork filled with stone ballast on a length of 100 feet abutting against the solid rock. The width of the new work is 15 feet, and its average height is 10 feet. Two courses of face timbers and cross-ties at the shore end of the pier were renewed on a length of 550 feet and new floor stringers, floor and snubbing posts put in. Some 12 x 12 timbers in the western face of the structure at its outer end, which had been broken by ice, were renewed and this face was sheathed with 6-inch maple 15 feet long on a distance of 200 feet. The work was done by day labour at a cost of \$3,505.75.

During the fiscal year 1899 the outer end of the pier completed in 1885 and the four extensions built subsequently, which had all settled, in some places as much as 4 feet, were raised to the proper level on a length of 600 feet, the floor

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stringers, flooring and snubbing posts had to be for the most part renewed. The two slips on the eastern side, which had been damaged by ice, were repaired, and 16 toises of stone ballast were put in the wharf where required. The work was done by day labour at a cost of \$3,036.59.

The total amount expended at this place is \$85,247.95 as follows:—

Construction.....	\$76,285.86
Repairs.....	8,962.09
	<hr/>
	\$85,247.95

## BEAUPORT.

The village of Beauport, in the county of Quebec, is situated at the mouth of the river of the same name, on the north shore of the River St. Lawrence, two miles below the city of Quebec. It contains two large flour and grist mills, nail, match, grindstone, cement, lime and cotton factories, and the building stone, of which there are extensive quarries, is in great demand, large quantities of it being annually shipped. Spring tides rise 21 feet, neap tides 13 feet. At low water spring tides, the water of the St. Lawrence recedes about 3,700 feet from the mouth of the Beauport River.

In 1888 a wharf 200 feet long, 25 feet wide and 8 feet high at its outer end, situated on the west shore of the Beauport River at its mouth, was purchased from Mr. Edouard Caron for the sum of \$800. The purchase was made subject to the structure being thoroughly repaired and raised 3 feet by the vendor. The work was completed to the satisfaction of the department in 1890, when the total amount paid out, including legal expenses, was \$932.07. The wharf was then 11 feet high at its outer end, which stood in 10.80 feet of water at high water spring tides. In 1890 the filling of the wharf with stone ballast was completed, and its approach raised at a cost of \$300. In order to provide increased shipping accommodation a close-faced cribwork extension, 121 feet long and 30 feet wide, was built to the old work during 1898, at a total cost of \$3,352.58. The new work is 14 feet high for half its width, and from 7 to 9 feet high for the other half, and affords an increased depth of 6 inches of water at its outer end at high water spring tides. Its foundation has been carried down to a depth of five feet below the level of the beach in order to render dredging along its face possible should it be required.

During the fiscal year 1899 the sum of \$3,998.62 was spent in extending the pier at the mouth of River Beauport, or rather of enlarging what was already done. The old wharf was raised 16 inches and three tiers of face timbers put in one half of it; this portion was rough crib with one full face only on river side (200 feet long), filled with stone and gravel 20 feet wide, giving an area of 20,800 square feet of wharfage.

The whole work done during the year is built up with cedar, red spruce and white pine.

The whole contour of both old and new work is sheathed full height with white pine and red spruce deals.

During the last fiscal year an additional length of 200 feet of close-faced cribwork was laid out at the end of work previously done on government wharf at mouth of Beauport River.

The amount spent was \$4,000 in building up 200 feet long by 40 feet wide and 8 feet high on one-half this width, fronting the channel, and 3½ feet on the other rear half. In order to secure better foundations, the bank had to be cut

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down on a length of 205 feet to a depth of 4½ feet for rear line sloping down towards bed of river, taking in a width or strip of 34 feet of mud, clay and loose sand all mixed; some 733 yards of which were removed; 9,500 feet of ballast flooring, 6,626 cubic feet square timber, and 538 feet of round 12" to 14" were used. The work was above the average.

Total expenditure to 30th June, 1900 \$18,650.47.

This wharf was transferred to control of Department of Marine and Fisheries on 19th October, 1891.

#### BELCÉIL (GUARD PIERS AND GUIDE WALL).

Belcél is a post village in Verchères county, on the north side of the Richelieu river, and a station on the Grand Trunk Railway, 21 miles north-east of Montreal. It has an express office, one store, two hotels, one saw mill and the works of the Hamilton Powder Company. Population four hundred. The Richelieu River leaves Lake Champlain at its northern extremity and after a course of 80 miles enters the St. Lawrence at Sorel. It is broader and more rapid in the former than the latter part of its course, and near its center it expands into the Basin of Chambly. The Richelieu forms an important part of the navigation between the St. Lawrence and the Hudson River.

South of the Grand Trunk Railway bridge which crosses the river at Belcél, the government built a number of piers and booms on both sides of the channel to facilitate the passage of steamers and barges coming down the rapid current of the river and going through the narrow passage of the draw-bridge, and to prevent them from being carried out into shallow water. There are eight piers or four on each side of the channel, distant from 80 to 100 feet from one another.

From 1885 until 1888 some slight repairs were made to the booms at a cost of \$353.43. In 1890-91 three of the piers were rebuilt from the water line and some slight repairs were made to the booms at a cost of \$1,500.35. In 1891-2 two other piers were rebuilt from the water line at a cost of \$1,193.38. In 1895-6 some slight repairs were made to the booms at a cost of \$144.79.

In 1896-7 it was found that the guide piers on the west side of the river—four in number—built many years ago, were in such bad condition that they could not be properly repaired, and an entirely new line of guide works was adopted. It was decided to build a solid cribwork wall from the Grand Trunk Railway pile abutment upward, following the line of a 15 curve (above the natural curve of the shore) for a distance of 337 feet: to remove the four old piers and booms, and to dredge a wider channel for the free passage of boats. During the year some dredging was done amounting to \$730.45 and \$2,170.12 was expended in procuring stone, iron, etc., required for the construction of the cribwork. In 1897-8 the sum of \$5,974.28 was expended in building the cribwork up to an elevation of 15 feet. This work when completed will be 337 feet long, 15 feet high.

During the fiscal year 1898-9 the cribwork wall was completed to a height of 20 feet on its whole length of 337 feet, terminated at its upper end by an ice-breaker, and the filling of the space between the guide wall and the bank of the river was commenced.

The work was done by day labour at a cost of \$5,496.39.

In 1899-1900, the inner face of the guide wall was sheated a length of 150 feet from its up stream end, with 3 inch pine planks, and the filling of the space between the guide wall and the bank of the river was completed at a cost of \$3,073.43.

The work is now all completed and has given general satisfaction.

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The total amount expended on this channel since 1895 is \$19,636.62 as follows :

Repairs and reconstruction of mooring piers.....	\$ 2,191.95
Construction of guide wall.....	17,444.67
Total.....	\$19,636.62

## BERTHIER (EN BAS).

The village of Berthier, in the county of Montmagny, is on the south shore of the St. Lawrence, 24 miles below Quebec. Spring tides rise 20 feet, neap tides 13 feet.

*Construction.*—A landing pier was completed at this place in 1853 at a cost of \$37,724.14 and a sum of \$1,760.00 was expended for repairs up to June 30, 1867. The pier, which was built of cribwork filled with stone ballast, was 466 feet long, of a uniform width of 32 feet with the exception of the outer 57 feet which was 60 feet wide and 34 feet high at its outer end, standing in from 6 to 11 feet of water at low water spring tides. In 1883 an appropriation was made for the construction an extension 100 feet long and 30 feet wide, with the outer end standing in 14 feet at low water spring tides. It was built by contract and completed in 1886 at a total cost of \$11,310.39.

*Repairs.*—In 1877-8 the pier was thoroughly repaired; some of the face timbers and ties which were decayed, were renewed, and the whole roadway was planked over to prevent the broken stones of which it was made, from being washed out by the heavy seas which frequently broke over the pier. The total expenditure for repairs to this work since Confederation was then \$9,024.15. Owing, however, to the age of the main portion of the work, constant repairs were required, and up to 1896, a further sum of \$3,656.14 was expended in renewing portions of the flooring, cap pieces, corner sheathing and moving parts, and for the reconstruction of the movable slip which was broken during the fall of 1889. In the year 1898, 250 planks were renewed in the top flooring at a cost of \$98.15.

During the fiscal year 1899 the two <sup>1</sup>last courses of face timbers were renewed on a length of 125 feet at the outer end, the planking of the movable slip, the flooring on a length of 75 feet, the posts and cross beam supporting the end of the movable slip, four snubbing posts and 175 feet of capping were renewed; a winch used for raising the slip, which was broken by ice was replaced by a new one, new one, the amount expended was \$385.07.

The total amount expended at this place is \$63,957.04 as follows :—

During the last fiscal year the top of the pier was renewed on a length of 510 feet, 32 feet wide and 6 feet high, the slip on the eastern side has been rebuilt on a length of 65 and 10 feet wide, other trifling repairs were effected, the work was done by day labour at a cost of \$4,738.12.

The total amount expended on this work is \$68,696.16 as follows :—

Construction and repairs prior to Confederation.....	\$39,484.14
"    since Confederation.....	11,310.39
Repairs and reconstruction.....	17,901.63

\$68,696.16

This work was transferred to control of Department of Marine and Fisheries on 26th April, 1895.

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## BERTHIER (EN HAUT).

Berthier (en haut), in the county of the same name, is a town of 1,600 inhabitants situate on the north shore of the St. Lawrence, 45 miles below Montreal, and opposite the town of Sorel.

*Construction.*—In order to protect the village and wharfs against the action of drift ice, the sum of \$2,000 was appropriated by Parliament in 1886 for the construction of an ice pier which was completed in 1887, at a total cost of \$1,611.04. Being found too low, it was raised three feet in 1888 at a cost of \$99.97.

Sufficient protection was not, however, afforded by the work to prevent considerable damage being done by the ice during the spring floods of 1896. A new ice pier 25 by 30 feet high, was therefore constructed in 1897 on the edge of the beach, at the upper end of the town, at a total cost of \$2,584.16. The piers have answered all expectations.

*Repairs.*—In 1892, minor repairs were effected to the ice pier built in 1887, at a cost of \$13.50. In 1897 attention was called to the fact that the only protection the lower part of the town had against ice shoves, was a low ice breaker at the head of the Richelieu and Ontario Navigation Company's wharf. The ice breaker being very much out of repair, and the formation of the shore such that the construction of a new pier, in an equally good position would have been costly and an impediment to navigation, permission was obtained from the company to repair and increase the height of their work. This was done at a cost of \$733.21.

Minor repairs were effected in 1898 to the ice pier built in 1897 at a cost of \$8.50.

The total amount expended on the above mentioned works is \$5,050.46, as follows:

Construction.....	\$4,295 17
Repairs.....	755 29
Total.....	\$5,050 46

## BIC.

Bic is an important village and summer resort, in the county of Rimouski, on the south shore of the St. Lawrence, 170 miles below Quebec. It contains a number of flour, saw and carding mills and two cheese factories. Spring tides rise 16 feet, neap tides 11 feet.

*Construction.*—In 1884 it was decided to build a landing pier to accommodate the extensive local trade of the village. The work was carried out by day labour and completed in 1887 at a cost of \$15,931.08. It is situated to the eastward of a group of islets which lie at the mouth of the Bic River, and is 1,120 ft. long over all, of a uniform width of 20 feet, apart from its outer 85 ft. which is 30 ft. wide, and 15 feet high of its outer end, which stands in 12 feet of water at high water spring tides, and dries at low water of both spring and neap tides. The pier consists of 22 cribs placed 25 feet apart connected with platforms. The shore end crib is 35 feet long and 20 ft. wide, the two outer ones, which constitute the head of the pier, are 30 feet square and the remaining nineteen are 25 feet long and 20 feet wide. An opening 50 feet wide has been left between the second and third cribs from shore, in order not to interfere with a branch channel of the river. The cribs are substantially built of close-faced cribwork, with 12 x 12-in. timber, and filled with stone ballast.

*Repairs.*—Minor repairs were effected to the work in 1894 at a cost of \$197.50, and in 1896 a further amount of \$587.22 was expended in renewing portions of the flooring, cap pieces and stringers which had become decayed. During 1898, 16,215 square feet of the flooring out a total area of 22,952 square ft. were

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renewed with 3-in. spruce deals; also 1,500 ft. of 8 x 8-inch capping. The floor stringers were raised and strengthened where required, placing upright posts under them, and a crib 9 feet long 20 ft. wide and 6 feet high with vertical posts to support the flooring, was built in the centre of the 50-foot opening originally left in the shore end of the work. These repairs were effected by day labour at a cost of \$1,248.85.

During the fiscal year 1899, the sum of \$90.91 was spent in effecting sundry repairs to Bic wharf which consisted in putting some spruce sheathing (deals 3in.) on some of the detached cribs and filling same with ballast.

The total expenditure on this work is \$18,061.76.

Construction.....	\$15,931 08
Repairs.....	2,130 68
Total.....	\$18,061 76

## BOUCHERVILLE.

The village of Boucherville is situated on the south shore of the St. Lawrence, in the county of Chambly, 9 miles below Montreal.

*Construction.*—During the winter of 1888-9 the Boucherville Navigation Company built a block 54½ feet long and 23 feet wide, with a breakwater 10 feet long at the upper end, at a distance of 175 feet from the shore. The block was handed over by the company to the municipality of Boucherville in the summer of 1890. During the winter of the same year the Department was asked to connect the block with the shore, and an examination of the locality was made at a cost of \$20.85. In 1891 an approach of solid cribwood, 175 feet long and 24 feet wide, was built at a cost of \$3,663.68.

*Repairs.*—During the year 1898 the sum of \$1,079.19 was expended for general repairs. The upper or western face of the work, the breakwater and the outer face of the head of the pier were sheathed down to low water line, with 3 inch hemlock deals, the flooring of the slip was renewed, and the corners of the head of the pier and of the slip, the slanting face of the breakwater and the angle formed by the flooring and face-timbers along the whole length of the western face of the approach were entirely covered with boiler plate ⅜ inch in thickness.

The total amount expended on this work is \$4,763.72, as follows:—

Construction.....	\$3,684 53
Repairs.....	1,079 19
Total.....	\$4,763 72

## CACOUNA.

Cacouna, one of the favourite summer resorts of Canada, is an important village in the county of Témiscouata, on the south shore of the River St. Lawrence, 120 miles below Quebec. Spring tides rise 19½ feet, neap tides 9½ feet.

In order to accommodate the trade of the village and surrounding localities it was decided in 1891 to commence the construction of a landing pier off Indian Point and to add yearly to its length until a depth of about 13 feet of water, at high water spring tides, would be reached. To more promptly provide the needed landing accommodation the construction of the pier was commenced by day labour, during the same year, at its outer end, by the building of an isolated block 103 feet long, 24 feet wide at the top and 27 wide at the base, and respectively 17 feet 3

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inches and 16 $\frac{1}{2}$  feet high at the outer and inner ends. The work, which was built of openfaced cribwork, with 12 by 12 inch timber and sheathed on all its faces with 3 inch spruce deals, was completed in 1894 at a cost of \$6,828.03. Its head stands in 12 feet 9 inches of water at high water spring tides, and is about midway between high and low water lines of spring tides, about 875 feet distant from the former. In 1895 an extension shorewards 60 feet long, 22 feet wide and 16 feet high at its inner end, was built in the same manner as the main block at a cost of \$2,017.34.

During the year 1898 a further extension towards Indian Point, 143 feet 8 inches long, 22 feet wide and 15 feet high at its inner end, built of close-faced cribwork and sheathed on all faces with 3 inch spruce deals was added to the structure at a cost of \$3,679. Materials, timber and iron, worth \$1,300 were left on hand to be used in the extension built the next year. The work was 306 feet 8 inches long, which left a length of about 568 feet yet to be built to connect it with Indian Point.

During the fiscal year ending June 30 1898, a sum of \$3,984.93 was spent in extending the Cacouna isolated block some 305 feet towards the shore. The work is close-faced cribwork, the flooring is of 3 inch spruce deals but not capped.

During the fiscal year 1898-9 the cribwork wall was completed to a height of 20 feet on its whole length of 337 feet, terminated at its upper end by an ice-breaker, and the filling of the space between the guard wall and the bank of the river was commenced.

The work was done by day labour at a cost of \$5,496.39.

During the last fiscal year the pier was completed to the shore by the construction of a further length of 290 feet, which was built by contract at a cost of \$5,931.00.

The pier is now 901 feet long, 24 feet wide on a length of 103 feet at the outer end and 22 feet wide for the remaining length of 798 feet, the outer end is 17 feet 3 inches in height and stands in 12 feet 9 inches of water at high water spring tides.

The total amount expended on the construction of this pier is \$23,440.30.

#### CAP A L'AIGLE.

Cap à l'Aigle is on the north shore of the River St. Lawrence, in the county of Charlevoix, 87 miles east of Quebec and 3 miles below Murray Bay, the place is becoming more frequented every year as a summer resort.

Spring tides rise 20 feet, neap tides 13 feet.

*Construction.*—During the year 1881-2 a landing pier, 160 feet long, 25 feet wide at the inner end and 35 feet wide at the outer end, with a depth of 17 feet at the outer face, at low water spring tides, was built to accommodate the local trade, at a cost of \$2,946.25. In 1882-3 a combined waiting room and freight shed was erected on the pier at a cost of \$250, and in 1883-4 fenders and posts were placed on the structure, the amount expended being \$345. In order to meet the requirements of the fast increasing traffic of the locality, which is without railway communication, and to provide more accommodation to the steamers calling at the pier, an extension 50 feet long, 40 feet wide and of an average height of 42 feet, was built in 1897-8, on the eastern side, at a cost of \$4,754.44.



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During the last fiscal year the inner end of the pier was widened by 13 feet on a length of 66 feet, the addition being 16 feet high. An open shed, 58 x 23 feet was built at the outer end, with a waiting room 10 x 18 feet at the eastern end of this shed. A movable slip, raised and lowered by means of chains and winches, was built in the new extension constructed in 1898 and the old slip filled with stone ballast and covered over. The sheathing on the western side was renewed on a length of 80 feet and a railing placed on a length of 75 feet on the western side of the pier. The work was done by day labour at a cost of \$1,488.62.

The pier is now 160 feet long with 85 feet of mooring face at the outer end and 35 feet wide at the inner end, the depth of water at the outer face is 17 feet at the western corner, and 13 feet at the eastern corner. The pier is entirely built with cribwork filled with stone ballast and sheathed with rock, elm and maple 6 inches thick.

*Repairs.*—Owing to its exposed situation the pier has been frequently damaged by ice, and up to June, 1898, the sum of \$2,086.62 had been expended for repairs, of which \$1,270.13 up to 1894, and \$816.49 in 1897. In 1898, after the completion of the new extension, it was found necessary to repair the planking of the old part of the pier, the amount expended being \$259.95.

The total amount expended on this work is \$12,130.79, viz :

Construction.....	\$9,784.32
Repairs .....	2,346.47
	<hr/>
	\$12,130.79

This work was transferred to control of Department of Marine and Fisheries on 13th July, 1895.

## CAP CHATTE.

Cap Chatte is situated in the County of Gaspé. In 1897 a small landing pier was constructed.

During the last fiscal year the training pier, along the upper side followed by the channel of the river Chatte, across the foreshore of the St. Lawrence, which was commenced in May, 1900, was brought to a length of 368 feet in the following August at a cost of \$5,500.00.

The object of this pier is to facilitate the passing of vessels from the inner basin or anchorage at upper part of river, and to prolong the time of the vessels remaining afloat in the basin, also to induce a scouring by which the channel would be deepened.

The dimensions of this pier are :—length 368 feet, average width 21 feet, average height 13½ feet, the whole strongly built on the very edge of the west bank of river. Total cost \$5,500.00.

At present moment the river has deepened from 2 to 3 feet by scouring.

Total amount expended to 30th October, 1900—\$5,600.00.

## CAP DE LA MADELEINE.

Cap de la Madeleine is situated in the County of Champlain, on the River St. Lawrence, three miles from Three Rivers.

In 1887 a wharf was built and in 1894 an extension of pile work 40 feet long, 24 feet wide and 19 feet 6 inch in height was constructed: the old work was raised to level of new and the whole work put in good order.

The work is now 87 feet long in front, 22½ feet wide with a landing 11 feet wide, the length is 250 by 23½ feet wide and 14½ feet high above low water with five feet of water at its outer end.

Total expenditure to 30th June, 1900, \$7,881.85.

## CAP SANTÉ.

The village of Cap Santé, the chief town of the county of Portneuf, is situated on the north shore of the St. Lawrence, five miles below Portneuf, and 31 miles above Quebec. Spring tides rise 14½ feet, neap tides 8½ feet. At neap tides the boats can only approach the landing pier when the water has risen to the height of 7 feet 9 inches, and even then only with danger, owing to the numerous boulders which are strewn along the foreshore of the river. The boulders form part of a reef which extends along the line of low water at a distance of about 1,100 feet from the head of the pier. The work of blasting the most dangerous boulder from the channel leading to the pier was commenced in 1889 when a sum of \$252.43 was expended. The channel was further improved in 1890 at a cost of \$500.85. During the year 1898 a number of other boulders was blasted and removed at a cost of \$423.49.

The wharf at this place is built parallel with the shore and consists of four cribs of different dimensions laid close together, making a landing 118 feet long, is the property of Mr. Flavien Morissette, of Cap Santé.

This wharf is visited generally twice a week by a boat called "L'Etoile," plying between Quebec and St. John des Chaillons, and also at different times by schooners, this landing being high and dry at low tide can be approached by boats only during three hours of each high tide and very often cannot be landed at all during high tides. As the bed of this river, in front of the wharf, gradually slopes down, an extension of 50 feet out from the present wharf would increase the depth of water by 5 feet and would prove sufficient for boats drawing 4½ feet (like "L'Etoile") to land mostly at every stage of the tide as the channel to the wharf has been cleared of boulders from the outer chain leaving it 5 feet during low water neap tides.

The wharf is built of round and flatted timber of many sizes, not well secured and badly put together, the outer face is covered with three inch plank and some of the face timbers bulge out considerably, being pressed out by the ballast filling. It is loaded to the top with stones and the cover is formed of a layer of gravel about one foot thick.

The wharf in question, in its present condition, will either collapse or be carried away by the ice very soon, and is accessible only for a very limited time each tide, proves to be a great disadvantage to the population of the village and of the surrounding country, who find it their only commodious outlet for their shipments to the Quebec market the railway being 6½ miles from the village.

The sum of \$190 was expended in repairs to the old wharf and the starting of an extension outwards of 50 feet north and south and 85 feet east and west, the latter fronting on the St. Lawrence. The work on the old wharf consisted in

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stone filling, cutting down some portion of the useless old timbers, renewing and strengthening nearly almost all the remainder, the whole thing being almost ready to fall to pieces over the beach; the ground and open space in rear was levelled and filled up, and both sides embanked with dry stone walls.

Next year the block will be thoroughly packed, by hand, with stone ballast, broken stone and coarse gravel laid on top for roadway, instead of planking. The slope produced northwards to depth of old wharf and the shed.

Boulders in vicinity of wharf will be removed.

Total expenditure to 30th June 1900 is \$3,076.77.

## CARLETON.

Carleton is the most flourishing parish on the Baie des Chaleurs, in the county of Bonaventure, and 12 miles by water from Dalhousie, N.B.

The village is built on the shore of the Tracadigèche Bay, at the foot of a mountain over 1,800 feet high, and is one of the most picturesque sites of the coast; it is already in great repute as a watering place.

The sum of \$55.09 was expended in course of the year 1899 in effecting some minor repairs to planking, sheathing of steps, etc.

The Carleton wharf, built in 1882-3, has a total length of 234 feet, including an outer end block of 39 x 39 feet, the inshore end of 195 feet is only 20 feet wide on top. The average depth of water at outer end is 10 feet at low water spring tides.

Total expenditure to 30th June, 1900, \$8,466.03.

This wharf was transferred to control of Department of Marine and Fisheries on 27th April, 1889.

## CASCADES.

Cascades wharf is situated on the Ottawa River, in the county of Vaudreuil, and six miles east of Cedars Village.

The wharf is 100 feet in length, 25 feet in width, the top being 5½ feet above low water, with two approaches and a shed 40 by 24 feet erected thereon.

Total expenditure to 30th June, 1900, \$3,416.90.

This wharf was transferred to control of Department of Marine and Fisheries on 29th January, 1887.

## CEDARS.

Cedars is situated on the north shore of the River St. Lawrence, 15 miles east of Coteau Landing, in the county of Soulanges.

The landing wharf is 115 feet in length and 24 feet in width.

There is at the outer face 7½ feet of water at its lowest stage.

During the fiscal year 1899 the decayed upper structure was removed to one foot below the low water level, and rebuilt.

The timber used is hemlock, 12-inch x 12-inch. The work was done by day labour at a total cost of \$1,498.96.

Total expenditure to 30th June, 1900, \$6,035.83.

This wharf was transferred to control of Department of Marine and Fisheries on 16th September, 1896.

## CHICOUTIMI.

The town of Chicoutimi, in the county of the same name, is situated on the south shore of the Saguenay River 71½ miles above Tadousac, and at the head of navigation. The Richelieu and Ontario Navigation Company's boats call two to six times a week at the Chicoutimi pier, during the season of navigation, with passengers, freight and mails.

At the mouth of the River Chicoutimi, about a mile above the pier, there is an extensive lumbering establishment belonging to the Messrs. Price who export large quantities of sawed lumber, laths, shingles, &c., to Europe and elsewhere, in ocean vessels and large schooners which ascend the Saguenay to the town. Spring tides rise 15 feet, neap tides 8 feet.

*Construction.*—The landing pier was commenced in 1873 by the St. Lawrence Tow Boat Company and completed by the Dominion Government to whom it was handed over in 1874, at a cost of \$14,193.40. From 1874 to 1882 inclusively, it was extended and improved at a total cost of \$2,823.73. The pier was then 282 feet long, and consisted of an approach 248 feet long and 30 feet wide and of a head block 34 feet long and 127 feet wide forming two wings respectively 70 and 27 feet wide. On the upper or 70-foot wing was a combined waiting-room and office 20 feet square.

The depth of water at the end of the pier, which was originally 10 feet at low water spring tides, was then reduced to 7 feet by the accumulation of slabs and sawdust from the mills at the mouth of the Chicoutimi River.

In 1883 the shore end portion of the approach on a length of 38 feet was embedded in an embankment upon which the station and sheds of the Chicoutimi branch of the Lake St. John Railway are now erected. The length of the approach was thereby reduced to 210 feet. In 1884 the approach was widened 70 feet by filling in with slabs the whole space, 210 feet in length, between the upper or 70-foot wing and the shore, and a storehouse 40 feet long and 24 feet wide was erected on this extension at a total cost of \$2,145.84. The filling was not, however, carried up to the level of the top of the pier until 1885, when the extension was floored in a manner similar to the rest of the work. A separate waiting-room was also erected on the lower or 27 foot wing. The amount expended was \$2,042.11. In 1890 a cribwork retaining wall 14 feet wide was commenced along the slab filling built in 1884, and the flooring was repaired where required at a total cost of \$1,005.81. In 1891 the cribwork retaining wall was completed, a shed 28 x 29 feet built at the southern end of the pier and the flooring was repaired at various places at a cost of \$1,802.70. In 1897 the pier was again widened by the addition of cribwork 30 feet wide along its lower or eastern face, from the lower or 27-foot wing to shore, a distance of 210 feet. The cribwork was fully balasted and floored with 3-inch tamarack planks, and twenty-five fenders were placed along its face. The pier was also sheated for a length of 50 feet along its northern face in order to complete the sheating all around the work. The total expenditure incurred was \$4,992.96.

As now completed the pier is 245 feet long and 130 feet wide. It is 29 feet high above the bottom of the river at its outer end, which stands in about 8 feet of water at low water spring tides.

*Repairs.*—In 1883 and 1886 minor repairs were effected to the flooring, &c., at an aggregate cost of \$288.55. In 1887 a slip was built at the outer end of the pier, the waiting-room was painted and general repairs performed at a cost of \$1,390.35. In 1889 the flooring of the pier was almost entirely renewed and six fenders, 14 inches square, were placed along its outer face at a cost of \$1,631.65. In 1892 and 1893 the flooring of the pier was completely renewed on a length of 210 feet and a width of 110 feet, with red spruce planks 5 inches in thickness; the east side of the structure was raised 18 inches; the waiting-room was painted both inside and outside, and two mooring posts were renewed. The expenditure incurred during the two years was \$3,024.04. In 1894 a sum of \$1,999.60 was expended for the construction of a movable slip and the purchase of two crab winches to raise it. During the years 1895 and 1896 a portion of the outer face and the whole of the eastern face of the structure were resheathed with red spruce six inches in thickness, and the portion of the flooring not completed in 1893 was laid. Expenditure during the two years \$3,991.88. During the year 1898 a sum

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of \$239.79 was expended on minor repairs to the flooring, sheds and waiting-room.

During the fiscal year 1899 a freight shed 60 x 30 feet was constructed on the south side of the pier for the storage of butter and cheese. Part of the top planking was renewed. The work was done by day labour at a cost of \$1,499.27

During the past fiscal year the pier was raised 3 to 5 feet over the whole surface, stone ballast was placed in the outer end which was also sheathed with tamarack and covering renewed with 3 inch plank at a cost of \$5,050.59.

Total expenditure to 30th June, 1900 is \$48,122.30.

## COTEAU DU LAC.

The village of Coteau du Lac, in the county of Soulanges, is situated on the north shore of the St. Lawrence, thirty-six miles and a half above Montreal.

*Construction.*—In 1888 the construction of a landing pier was commenced, and was completed in 1889 at a cost of \$6,918.71. It consists of a head block of solid cribwork, 101 feet long and 21 feet wide, with a cribwork extension, 40 feet long and 47 feet wide, built along the middle of its inner face, and a block and span approach 75 feet long and 26 feet wide. The outer face of the head block is 15 feet high above the bottom of the river and stands in 10 feet of water at ordinary low water. Across the inner end of the extension to the head block is built a freight shed of the full width of the extension and 20 feet long, with a passageway for vehicles through its centre.

*Repairs.*—During the year 1894-5, sundry repairs were effected to the structure at a cost of \$249.99. In 1896-7 most of the floor stringers and the whole flooring of the pier, which were decayed, were removed, new floor stringers were put in and the whole structure was refloored with 4-inch hemlock planks at a cost of \$694.58.

In 1897-8 sundry repairs were made to the corner sheathing, capping, etc., at a cost of \$200.41.

Total expenditure on this work is \$8,063.69 as follows:

Construction.....	\$6,918 71
Repairs .....	1,144 98
Total.....	\$8,063 69

This pier was transferred to control of Department of Marine and Fisheries on 28th August, 1896.

## COTEAU LANDING.

Coteau Landing, the chief-lieu of the county of Soulanges, is situated on the north shore of the St. Lawrence, at the foot of Lake St. Francis, thirty-six miles above Montreal, and two miles from Coteau Station on the Grand Trunk Railway.

*Construction.*—In 1871, a mooring pier was built by the department at a distance of 880 feet from shore, and in February, 1872, a contract was entered into for the enlargement of the pier and its connection with the shore by a block and span approach. The work was completed in October, 1875, at a cost of \$11,453.88. It consists of a head block 249 feet long and 24 feet wide, with an ice breaker 30 feet long at its up-stream end, and of an approach 880 feet long and 12 feet wide except for a length of 92 feet near the head block where it is 24 feet wide, to give vehicles room to pass. The head block, and the portion of the approach 92 feet in length immediately adjoining, are built of open-face cribwork filled with stone ballast, and the remaining portion 788 feet in length of the approach, is a block and span structure. The outer face of the head block is 18

feet high above the bottom of the river and stands in 12 feet of water at low water.

*Repairs.*—Minor repairs were effected to the pier in 1882 at a cost of \$8.00. The structure was considerably damaged by ice in the spring of 1896 and was thoroughly repaired during the same year at a cost of \$1,544.42. In 1889 the department commenced the reconstruction of the block and span approach, which was completed during the year 1889-90 at a cost of \$4,005.91. The new approach has a general width of 12 feet, with two sidings 115 feet long and 12 feet wide for the passing of teams. In 1891, the reconstruction of the head block 279 feet long, 24 feet wide was commenced, and was completed in 1892 at a cost of \$5,658.42. In 1897, the wharf was again thoroughly repaired. Some of the stringers were renewed and the whole of the approach, and a portion of the head block were refloored with hemlock planks 4 inches in thickness at a cost of \$1,797.03. During the year 1898 the outer face of the head block was resheathed with 6 inch hemlock at a cost of \$314.20.

The total amount expended on this work is \$24,781.86 as follows :—

Construction, .....	\$11,453 88
Repairs and Construction .....	13,327 98
Total.....	\$24,781 86

During the past few years considerable dredging has been done in the vicinity of Coteau Landing.

This pier was transferred to control of Department of Marine and Fisheries on 28th August, 1896.

#### COTE STE. CATHERINE.

Côte Ste. Catherine is a landing place, situated on the south shore of the River St. Lawrence, in the county of Laprairie, at about 5 miles west of the village of Laprairie. A steamboat ferry is open to Verdun for passengers and carriages, making four trips daily.

In order to give better accommodation to the farmers to take their produce to Montreal by the ferry boat, it was decided to build a permanent wharf at Côte Ste. Catherine.

The structure consists of a head block of close-faced cribwork 82 feet long, 20 feet wide paralld to the current, terminated at its upper end by an ice-breaker; the approach from the shore to the block is also of close-faced cribwork, 115 feet long by 18 feet wide. The outer face of the block stands in 6 feet at low water level.

The work commenced in October 1899 and completed in June 1900, was carried out by day labour at a cost of \$3,199 46.

#### DITCHFIELD.

Ditchfield is situated on Lake Megantic, a small pier was built at this place in 1887.

Total expenditure to 30th June 1900, \$1,484.75.

#### ETANG DU NORD.

Etang du Nord is at the western end of Grindstone Island, one of the Magdeline Islands, in the Gulf of St. Lawrence and in the county of Gaspé.

During the fiscal year 1899, the outer face of the breakwater at this place, having sustained considerable damage, was repaired.

The face timbers and sheeting were renewed on a length of 100 feet, and

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stone ballast was put in the breakwater where required, other trifling repairs were effected. The work was done by day labour at a cost of \$1,528.44.

Total expenditure to 30th June 1900, \$73,801.87.

## FLINT'S WHARF.

Flint's wharf is situated on Lake Megantic, was constructed in 1885, repaired in 1886 again in 1890.

Total expenditure to 30th June 1900, \$2,192.45.

## GATINEAU POINT.

Gatineau Point Village, county of Wright, is situated at the mouth of the Gatineau River, near the junction of this river with the Ottawa, and about one mile below the city of Hull.

In 1885-6, a wharf 107 feet in length, 29 feet in width, and having a depth of 8 ft. along its outer face at lowest water, was built at this place, together with two approaches, each 70 feet in length; also a retaining wall 230 feet long running north-westerly from the north approach. The space inclosed by the wharf and approaches was filled in with brush and earth. The object being to afford suitable landing and shipping accommodation for freight and passengers, not only to the permanent residents of the village, which number some 1,500, and to the inhabitants of the thickly settled surrounding country; but also for the benefit of the steadily increasing number of families, from the capital of the Dominion, who find it to their advantage to spend the hot summer months in this locality every year.

The expenditure being \$3,850.84.

During the fiscal year 1896-7, repairs were made to the face timbers, sheathing and mooring posts of the wharf, and the flooring was partly renewed; the total expenditure amounting to \$245.76.

In November, 1899, some repairs were done, consisting of renewal of one of the high protection posts, also to renew some planks, at a cost of \$92.35.

The total amount expended on the work is as follows, viz:—

Construction.....	\$3,850 84
Repairs .....	338 11
	<hr/>
Total.....	\$4,188 95

## GEORGEVILLE.

Georgeville is a village on the eastern side of Lake Memphremagog, in the county of Stanstead, and 11 miles to the southward of the village of Magog, at the head of the lake. It is a port of entry of considerable importance, and all steamers plying between Magog and Newport (State of Vermont, U.S.A.), call at the wharf.

This landing pier was built by subscription from the several steamboat companies, which kept it in repair until 1888, when its control was assumed by the Government. At that time it had a total length of 210 feet and a breadth of 18½ feet, and was supported on six cribs; a wing of say 56 feet by 12 feet had been added at the outer end where the depth available at ordinary low water was about 9½ feet. As originally completed it stood 18 inches above extreme high water, but owing to a permanent rise in the lake, caused by the construction of a dam at Magog, its top was, till 1888, level with the surface of the water, the consequence being that during periods of high water or when the wind blew strongly from the south, the paddles of steamers fouled with the pier and received more or less

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**Damage.** The top of the wharf, including the arm down to low water mark, was moved bodily to the west by ice in the spring of 1888 and many timbers were either completely torn away or broken, the platforms also sustaining considerable damage.

During the year 1888-89 some urgent repairs were made: the top timbers of each crib excepting the two shore ones, being renewed, as well as the platforms and flooring over the whole surface of the wharf at a cost of \$661.43. In 1889-90 the sum of \$1,995.27 was expended for the construction of two cribs 12 feet wide, 37 feet long and 16 feet high, which were set in front of and firmly bound to the two which actually formed the head of the wharf, to increase its resistance against ice shoves. The whole wharf was rebuilt from low water mark and raised two feet higher than its actual level. In the course of 1895 the approach to the landing block being defective, the municipality removed the flooring and platforms between the shore and the fifth pier and filled the whole with a solid earth and stone embankment 160 feet long. In 1897-98 some stringers were renewed and the whole outer block was replanked. A new waiting room was also built at a cost of \$678.96.

The cost of repairs made to this wharf may be summarized as follows:

1888-89 Urgent repairs . . . . .	S 661 43
1889-90—Construction and repairs . . . . .	1,995 27
1897-98—Repairs to outer block . . . . .	678 96
Total . . . . .	<u>\$3,335 66</u>

Total expenditure to 30th June, 1900, \$3,335.66.

#### GRAHAM.

Graham, a post village in the municipality of Comio, is situated on the south shore of the Lake of Two Mountains, in the county of Vaudreuil, 13 miles west of Vaudrenil and 4 miles east of Rigaud, it is a station of the Canadian Pacific Railway called "Lavigne."

Mr. William Graham of the locality owned an old wharf which he transferred to the government together with a right of way from the public road, at the foot of La Montée Ste. Marthe, to the wharf, a distance of 435 feet by a width of 30 feet.

The wharf was so much dilapidated that it had to be entirely rebuilt.

During September and October 1899 the approach of a new wharf was commenced, it consists of a solid stone embankment 230 ft. wide with side slopes 1 to 1. The embankment is now almost completed excepting 3 feet in height.

The work was done by day labour at a cost of \$1,125.76.

#### GRANDE DÉCHARGE.

Grande Décharge is situated on Lake St. John, 17 miles from Roberval. the Island House floating dock was transferred to the Department in 1895 and \$500.00 was expended in building an extension of 40 by 20 feet.

#### GRAND PABOS.

The harbour of Grand Pabos, in the county of Gaspé, is situated at the mouth of the river of the same name on the north shore of Baie des Chaleurs, 30 miles west of Percé, and about midway between Cape Despair and Pointe Maquereau.

In 1885 the department commenced the improvement of the harbour, which lies within the mouth of the river, by the removal of dangerous rocks which



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obstructed its entrance. This work was continued in 1887 and 1888, when a sum of \$2,582.93 was expended. In 1890 a combined training pier and breakwater of close-faced cribwork, 215 feet wide and about 10 feet high along its western face, was built on a reef which extends in an easterly direction off the west shore of the river into the bay. The amount expended was \$2,906.95. In 1893-4 the pier was extended to shore, the dimensions of the new work being: length 120 feet, width 21 feet, average height 11 feet. It was built of close-faced cribwork and completed during the year with the exception of the flooring, outside sheathing and some ballasting, at a cost of \$1,999.53. Work was resumed on the extension in 1894-5 and the portions unfinished were completed. Some dangerous rocks lying in mid-channel of the river and along the face of the work were also removed, the amount expended being \$1,558.99.

The training pier, which is now 335 feet long, has confined the river waters into one channel about 75 feet wide, 7 feet deep at low water spring tides, and practically clear of all obstructions. A few jutting points of rock will, however, have to be removed to make it perfectly safe at all times of tide.

*Repairs.*—In 1896-7 a sum of \$500 was applied in sheathing with spruce flatted to 10 inches in thickness, a length of 200 feet of the inner face of the training pier which had been damaged by ice. The repairs commenced in 1896-7 were completed during the year 1898 at a cost of \$799.15. The seaward face of the pier for a length of 309 feet and its outer end were sheathed with spruce flatted to 8 inches in thickness and from 10½ to 15 feet in length. The outer end of the work on a length of 150 feet was raised about 15 inches, and new stringers and flooring put in. During the fiscal year 1898 the sum of \$422.87 was expended in removing a shoal of rock 20 feet diameter, and 3½ to 4½ feet in height. The work was done by day labour in the months of August and September.

The total amount expended on this work since it was undertaken in 1885 is \$10,770.42, as follows:—

Improvement of channel.....	\$ 3,005 80
Construction of training pier.....	6,465 47
Repairs to ".....	1,299 15
Total.....	\$10,770 42

## GRANDE RIVIÈRE.

Grande Rivière, in the county of Gaspé, is situated on the Baie des Chaleurs, 21 miles south-west from Percé, and about 30 miles north-east of Port Daniel. Spring tides rise 6 feet 6 inches.

During the fiscal year 1899 the following repairs were effected to the wharf at this place: the sides were sheathed on a length of 556 feet with birch and hemlock timbers 8 inches and 5 inches thick respectively, birch fenders were placed on both inside and outside faces of the three landing stairs; the old sheathing was further secured on a length of 180 feet, the mooring posts were capped with galvanized iron and painted, and the top planking was levelled and partly renewed.

The work was done by day labour at a cost of \$773.28.

Total expenditure to 30th June 1900, \$41,555.66.

This wharf was transferred to control of Department of Marine & Fisheries on 6th July, 1892.

## GROSSE ISLE.

Grosse Isle is an island in the River St. Lawrence thirty-three miles below Quebec and about midway in the river which is nine miles wide at this part.

A quarantine station was established here in 1832 and extensive buildings

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have been erected. In 1848 a pier 345 feet long by 48 feet wide, was built at the south-western extremity of the island. In 1866 a small pier 120 feet in length by 28 feet in width was erected at the eastern end of the island for the special accommodation of the sick.

In 1872 the eastern pier was extended and in 1876-7 the western pier, which was much decayed, was repaired and partly rebuilt. The pier was repaired and extended so as to reach 10 feet at low water. During 1881 and 1882, a block 30 x 50 feet dimensions was built at the end of the eastern pier to admit the approach of vessels during low tide. A cribwork block 100 feet in length, was built from the inner end of the pier to the shore and a road 250 ft. long constructed to the main highway.

Neap tides rise 13 feet; springs rise 18 feet.

#### IBERVILLE.

The town of Iberville, the *chef-lieu* of the county of the same name, is situated on the eastern shore of River Richelieu, opposite the town of St. Johns, to which it is connected by a bridge for pedestrians and carriages. Population, about 2,000.

In 1897 the Government decided to build a wharf to facilitate the trade by water way.

The structure commenced in March, 1899, is situated at the foot of Market Street, and consists of the following, viz:—

(a). A stone embarkment 130 ft. long and 24 ft. wide with slopes of 1 to 1.

(b). A trestle approach 150 feet long by a width of 24 feet.

(c). A head of pile work 150 feet long, parallel to the channel, by a width of 40 feet, with two slips, and a storehouse 20 by 24 feet. The outer face of the wharf is 15 feet above the bottom of the river, and stands 3 feet above high water and 9 feet above low water levels.

The work done by day labour was not completed at the end of the fiscal year. Amount expended, \$6,784.32.

During the next fiscal year (1899-1900) the sum of \$2,098.94 was expended to complete the work and place a crane on the wharf, to accommodate the traffic.

The total expenditure on this work is \$8,883.26.

#### ILE BIZARD.

Ile Bizard is situated on the Rivière des Prairies in the county of Jacques Cartier 27 miles from Montreal.

In 1890 a pier was built consisting of four cribs with ice breakers, 20 x 30 feet at low water line and 20 feet square on top, placed 20 feet apart with a roadway covered with 3-in. pine plank. The approach is 43 ft. in length, the total length of the pier is 206 feet.

Total expenditure to 30th June, 1900, is \$8,708.42.

#### ILE AUX COUDRES.

Ile aux Coudres, with a population of about 1,500, is in the county of Charlevoix, 62 miles east of Quebec and  $1\frac{1}{2}$  miles from the north shore of the St. Lawrence, the upper end being opposite Baie St. Paul. The island is 9 miles long and 3 miles broad. It is divided into sixty-five farms, from which potatoes are the main produce. Spring tides rise 20 feet, neap tides 13 feet.

*Construction.*—In November, 1880, a contract was entered into with a large number of the inhabitants of the island on behalf of the municipality, which had voted \$4,000, to supplement a like amount voted by parliament for the construc-

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tion of a landing pier on the north shore of the island. The pier was commenced in 1881 and completed in 1882, the amount expended being \$3,718. The structure is 272 feet long and 20 feet wide, with the exception of a length of 74 feet at the outer end, which is 32 feet wide. It is 40 feet high at the outer end, where a dept of 16 feet is available at low water spring tides. In 1883 a freight shed was constructed at the inner end of the pier at a cost \$250. In 1884 the outer end of the pier having sunk considerably and the outer face being damaged by ice, repairs were commenced and completed in 1885 at a cost of \$1,298.51. In 1888 the sum of \$249.94 was expended in repairing fenders broken by ice. In 1890 two spans between inner piers were filled with cribwork to prevent a strong current running across the pier, at a cost of \$861.92. In 1893 and 1894 general repairs were effected; the outer end was raised 3 feet on a length of 50 feet, part of the planking was renewed and ballast put in, the amounts expended being \$252.46 and \$1,199.14 respectively in each year. In 1896 the broken timbers at the end were replaced and sheathed over, 100 feet of floor stringers were renewed and ten toise of stone ballast was put in at a cost of \$359.02. In 1897 trifling repairs to the corner sheathing were done at a cost of \$147.66.

During the fiscal year 1899 the top of the pier was entirely renewed on a length of 125 feet, 4 feet high. The face timbers which had been broken by ice at the outer end were renewed on a height of 6 feet and a length of 10 feet, with short pieces of ties put in. The sheathing on the outer end and 20 feet on each side, making a total of 70 feet, was renewed with maple timber 6 inches thick. The 3 inch sleathing on each side was repaired as well as the outer slip. The work was done by day labour at a cost of \$998.34.

During the last fiscal year 100 planks were renewed in the top flooring at a cost of \$50.09.

The total amount expended at this place is \$9,385.38, as follows :

Construction .....	\$4,829 92
Repairs. ....	3,557 12
Renewal of top. ....	998 34
Total.....	\$9,385 38

## ILE AUX GRUES.

Iles aux Grues, or Crane Island, with a population of about 640, is an island of 7,873 acres in extent which lies in the St. Lawrence, opposite Cape St. Ignace, 30 miles below Quebec. Spring tides rise 18 feet. Neap tides, 10 feet.

*Construction.*—In 1862, an isolated block and lighthouse were erected near the upper end of the island, in the harbour of Pointe aux Pins, at a cost of \$10,334.42. The block was placed about 140 feet above low water line of spring tides and was used as a landing for passengers and freight during the period of high water. To enable vessels to call and land passengers and freight at low water, a contract was entered into in November, 1881, for the construction of a pier 171 feet long, 25 feet wide at its inner end, 35 feet wide at its head, and 27 feet high, projecting from the block into four feet of water at low water spring tides. The work was completed in 1883 at a cost of \$11,716.17, but as it was not connected with the shore the accommodation it afforded to passengers and freight was so poor that it was decided to complete the structure. On the 30th January, 1884, a contract was therefore entered into for the construction of cribwood extension to shore, 468 feet long, 25 feet wide and from 7 to 15 feet high, which was completed in 1885 at a cost of \$9,848.27. The right of way from the shore end of the pier to the main road which had not been secured was purchased in 1894 at a cost of \$200, and in 1895 a sum of \$45.55 was paid for professional services in connection with the purchase.

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The pier is now 639 feet long, of a uniform width of 25 feet apart from its outer 75 feet which is 35 feet wide, and 27 feet high at its head which stands in four feet of water at low water spring tides. A portion of the block built in 1862 still remains, on the eastern side of the present pier. The whole work is built of close-faced cribwork, with square timber 12 by 12 inch dimensions, and is filled with stone ballast. Its outer end and corners, and the inner corner of the portion 35 feet wide are sheathed with timber eight inches in thickness. The cross-ties and longitudinals are round logs not less than 14 inches diameter at the small end.

*Repairs.*—No repairs were effected to the pier up to the year 1899; but, during the month of August, 1898, a portion of the flooring which had become dangerous was renewed, a path four planks wide was laid over the old flooring on the whole length of the structure; two ladders were placed, one on each side of outer end, and a snubbing post renewed. The work was done by day labour at a cost of \$105.58.

The total amount expended on the work is \$32,249.99, made up as follows:—

Construction, before Confederation.....	\$10,334 42
do since do .....	21,809 99
Repairs. ....	105 58
Total .....	\$32,249 99

#### ILE PERROT (SOUTH).

Île Perrot is an island in the county of Vaudreuil, at the confluence of the Rivers Ottawa and St. Lawrence, and between the Lake of the Two Mountains and Lake St. Louis. This island divides the Ottawa into two branches.

Both the Grand Trunk and the Canadian Pacific Railways cross the northern part of the island; but the nearest railway station to the parish and village of Île Perrot, on the north shore of St. Louis are those of Vaudreuil and Ste. Anne de Bellevue. The population of the parish is 860, and trade is principally carried on with the city of Montreal, viz., farm produce.

In 1887-88-89, a public wharf was built on the south shore of the island, on Lake St. Louis, about  $1\frac{1}{2}$  mile below the parish church of the village of Île Perrot. This wharf, as completed in 1889, is 611 feet long, and consists of: (a) a head block 120 feet by 30 feet sunk in 8 feet depth at low water, with return 34 by 16 in the rear of the east end; (b) nine cribs 24 feet wide, five being 20 feet long and four 12 feet long, and which are placed at intervals of from 22 to 25 feet and connected at top by timber spans of stringers and planking; (c) a shore abutment or approach 182 feet long and 16 feet wide. A freight and shelter shed 16 feet by 20 feet has also been erected in connection with this wharf.

In September 1899 a number of planks on the approach were renewed at a cost of \$165.81.

The amount expended on this work is as follows, viz:

Construction .....	\$12,420 55
Repairs.....	559 74
Total ....	\$12,980 29

#### ISLE PERROT (NORTH).

Île Perrot is in the St. Lawrence, south-west of the island of Montreal, between Lake of Two Mountains and Lake St. Louis. The island is about 7 miles long, and is in the county of Vaudreuil.

In 1897-8 a small wharf with a right of way on the north side of the island

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was purchased from Mr. Joseph Leduc for the purpose of providing a convenient landing on the Ottawa River shore. This right of way is 400 feet long and extends from the public road to the wharf, the first 355 feet having a width of 30 feet, and the remainder near the river a width of 100 feet. The wharf is close to and parallel with the shore, and is 20 feet wide by 52 feet long, at the head, being inadequate to the requirements of the traffic and in a dilapidated condition. An outer block was built close to the old wharf with a landing face of 80 feet and a width of 20 feet. This work, done by day labour, was commenced in June, 1898, and was not completed at the end of the fiscal year. It is built of close-faced timbers to a height of 19 feet and is sunk in 13 feet water.

A good road on the site of the right of way was also built from the public road to the wharf.

Amount expended, \$841.98.

During the last fiscal year the wharf commenced in 1898 was completed by day labour at a cost of \$2,486.73.

Total amount expended is \$3,328.71.

This wharf was transferred to control of Department of Marine and Fisheries on 6th October, 1897.

## ISLE VERTE.

The village of Isle Verte, the chief town of the county of Témiscouata, is situated on the south shore of the St. Lawrence, 16 miles below Rivière du Loup and 131 miles east of Quebec. It has a population of 4,500 and contains flour, carding and saw mills, and carriage and threshing machine factories. Spring tides rise 19 feet. Neap tides, 12 feet.

*Construction.*—In 1888 the construction of a landing pier was commenced by the building of an isolated block 50 feet long, 40 feet wide and 20 feet high at a distance of 1,300 feet from high water line of ordinary spring tides. The sum expended was \$3,606.30. The approach was commenced in 1889 and completed in 1893 at a cost of \$15,991.50. The pier is now 1,307 feet long, and consists of an open-faced cribwork approach 1,257 feet long, 21 feet wide, of an average height of seven feet, and of a head block 50 feet long and 40 feet wide. The head of the pier, which is 18 feet high above the bottom of the river, is dry at low water spring tides, but stands in 16 feet of water at high water. The top of the pier is two feet above high water spring tides.

*Repairs.*—In 1894, the north and east sides of the head block were sheathed with rock elm four inches in thickness, and strengthened by three iron straps four inches wide and  $\frac{3}{8}$  inch in thickness. The outer block was also floored and four ladders were fixed to its sides; expenditure \$998.28. In 1895 the south and west sides of the head block were sheathed with rock elm, and other work performed at a cost of \$903.02. In 1898 the flooring of the approach at its inner end, was entirely renewed on a length of 350 feet and the rest repaired. The middle pathway, 4 planks wide, was renewed from end to end of the approach, the cap pieces were partly renewed and the snubbing posts were painted. The work was performed by day labour at a cost of \$600.

During the last fiscal year the face timbers on the eastern side of the pier, which had been broken by ice, were renewed on a length of 250 feet, 2 and 3 courses in height and short pieces of cross ties inserted, 193 planks were renewed in the top planking, 52 birch fenders, 18 feet long, were placed on the eastern side and at the end and 10 toises of stone ballast were put in where required.

The work was done by day labour at a cost of \$500.93.

The total amount expended on this work is \$22,600.03 as follows:

Construction.....	\$19,597.80
Repairs.....	3,002.23

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\$22,600.03

## KAMOURASKA.

The village of Kamouraska is a favourite summer resort, situated on the south shore of the St. Lawrence, in the county of Kamouraska, 90 miles below Quebec. Spring tides rise 19 feet, neap tides, 12 feet.

*Construction.*—In 1887, a landing pier 190 feet long, 35 feet wide and 15 feet high at its outer end, was purchased for the sum of \$1,000.00, thoroughly repaired, and portions of it were rebuilt at a cost of \$2,818.37. In 1890 a close faced cribwork extension 109 feet long, 25 feet wide, and 19½ feet high at its outer end, was built at a cost of \$2,855.99. The pier is dry at low water, but at high water of ordinary spring tides, a depth of 16 feet is available along the end and sides of the extension built in 1890. The top of the work stands 3½ feet above ordinary high water spring tides. During the fiscal year 1899 an extension 150 feet long and 25 feet wide was partly constructed but not completed, as at the end of the fiscal year there still remained 9 feet in height to be built, the amount expended was \$5,020.22.

*Repairs.*—In 1891, the outer portion of the eastern face of the old work purchased in 1884 was demolished and rebuilt with an inclined slip 76 feet long and 10 feet wide at a cost of \$898.63. In 1897 the whole western face of the same work, 180 feet in length, was taken down and rebuilt for a width of 12 feet. The work was performed by day labour at a cost of \$995.62. In the year 1898 the inner portion of the eastern face of the old work, 110 feet in length, not rebuilt in 1891, was taken down and rebuilt for a height of 5 feet, the floor stringers and flooring were renewed on a length of 80 feet, both faces of the structure were sheathed with 3 inch deals on a total length of 190 feet, 48 cubic yards of stone ballast were placed in the slip, three snubbing posts were renewed and four ladders were placed, two on each side of the structure. The work was done by day labour at a cost of \$743.63.

During the last fiscal year the 150 feet extension was completed and covered with 3-inch planks, and two ladders were placed on each side of the extension, the amount expended was \$2,005.45. The total amount expended is as follows:—

Purchase of the work.....	\$ 1,000.00
Construction.....	12,700.03
Repairs.....	2,637.88
	<hr/>
	\$16,337.91

## KNOWLTON LANDING.

Knowlton Landing is situated on the west shore of Lake Memphremagog, in the county of Brome, P. Q., and about 11 miles from the town of Magog, which is at the foot of the Lake.

During the fiscal year 1891-92 an extension to the wharf was constructed. This extension of 51 feet by 75 feet was built of hemlock piles, covered with stringers and 3 inches planking at a cost of \$971.22. There is a depth of nine feet at low water at the end of the present wharf, which will permit of the steamers calling at all stages of water.

During the next year six fender piles were driven along the front of the wharf and three at each corner. A warehouse, with waiting-room, 40 feet by 23 feet was built and covered with an iron plate roof at an expenditure of \$918.09.

In the fiscal year 1899-1900, all the stringers and planking were renewed, also the corner fenders piles, and some repairs to the storehouse and stone approach, and the wharf is now in good condition. The work was carried out by labour day at a cost of \$714.12.

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The total expenditure of this work is as follows :

Construction.....	\$1,889.31
Repairs.....	714.12
	<hr/> \$2,603.43

## LACOLLE.

The village of Lacolle is situated in St. John's County. The wharf generally known as the Lacolle wharf is, however, situated on the east shore of the Richelieu River in the County of Missisquoi, 2 miles from Lacolle.

The wharf is built of piles and is 100 feet long by 100 feet wide and stands 6 feet above high water level. There is a depth of 16 feet 6 inches at its head.

## LAKE MEGANTIC.

Lake Megantic, is about 73 miles S.E. of Sherbrooke; length, 12 miles; average breadth, two to four miles, with a coast line of over 36 miles. This lake and the rivers that run into it, form the head waters of the Chaudiere River.

From the year 1882 to 1886, six wharfs were built on the shores of this lake to accommodate the trade of the several localities at St. Agnes, Lourdes, Flint, Victoria Bay, Ditchfield, Lake Megantic and Piopolis.

*St. Agnes* (late Morinville) is situated at the mouth of the Chaudiere River in the county of Beauce. The construction of the wharf was commenced in the year 1882-3 and completed during 1883-4 at a cost of \$5,876.78.

*Lourdes* is situated on the south-east corner of Lake Megantic, in the county of Compton. In 1883-4 a small wharf 190 feet long was built at a cost of \$1,194.71. In 1889-90 some slight repairs were made at a cost of \$169.68. In 1890-1 it was damaged by an ice shove and was repaired at a cost of \$500.

The total amount expended on this work is \$1,864.39.

*Flint's wharf* was built in 1884-5 at a cost of \$1,712.41. In 1886-7 it was damaged by ice and was repaired at a cost of \$323.78. In 1889-90 some small repairs were made at a cost of \$156.26. The total amount expended on this work is \$2,192.45.

*Victoria Bay* is situated in the township of North Marston in the county of Compton. In 1885-6 a small pier was built at this place for the accommodation of the local trade at a cost of \$854.20 and some slight repairs were made to it in 1889-90 at a cost of \$80.00.

*Ditchfield*.—A small pier was built at this place in 1886-7 at a cost of \$1,484.75.

*Piopolis* is a post village in Compton Co., on the west shore of Lake Megantic, 11 miles from Lake Megantic village, on the Canadian Pacific railway. The wharf at this place was built in 1882-3 at a cost of \$721.60. It is built of solid cribwork filled with stones, with a covering made of gravel. In 1887-8 some small repairs were made to it at a cost of \$77. In 1897-8 a vote of \$2,500 was granted to raise and repair the Government wharfs on Lake Megantic, on account of the rise in the lake level caused by the dam which the Montague Pulp Co., built in 1895 across the Chaudiere Rivir at its outlet from the lake. The wharf was repaired and raised five feet above its original height and a covering made to it in gravel at a cost of \$623.05.

The total amount expended on this work is \$1,421.65.

*Lac Megantic* is a post village in Compton Co. on the Canadian Pacific railway, 60 miles from Sherbrooke.

This wharf was repaired in 1889; again repaired and raised 4 feet in 1898.

During the last fiscal year an open shed 20 x 30 feet was built on the head of

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the pier, with a waiting room and small freight shed and the whole painted two-coats, the work was done by day labour at a cost of \$302.08.

The total amount expended in repairing this pier since its construction is \$2,419.58.

Megantic wharf was transferred to control of Department of Marine and Fisheries on 14th July, 1887.

## LANORAIE.

The village of Lanoraie is situated on the north shore of the St. Lawrence, in the county of Berthier, 46 miles below Montreal. It has considerable trade in flour, grain and cordwood.

*Construction.*—In 1884 the construction of an isolated block, 70 x 30 feet at the bottom and 54 x 27 feet on top, was commenced at a distance of 240 feet from shore; the work was completed in 1885 at a cost of \$5,032.01. In 1885 and 1886 the block was connected to shore by an approach 240 feet long, 25 feet wide, and of an average height of 12 feet, at a cost of \$6,886.36. The upper or western side of this approach, for a height of 6 feet from the top, was built on a slope of 6 inches per foot and sheathed with 4 inch tamarack planks, and the top of the approach was built on a grade of 4 feet per hundred. The depth of water at the head of the pier is 11 feet at extreme low water.

*Repairs.*—During the winter of 1887 the approach was damaged by an ice shove, which curved it slightly towards the east. In April, 1891, it was again moved to the eastward by another ice shove, which increased the pitch of the curve to 4 feet at a distance of 80 feet from the head block, and removed two courses of face timber on a length of 42 feet, and five fenders on its lower or its eastern side. Repairs were commenced on November 5, 1891, and completed on the 28th of the same month, at a cost of \$416 04. The missing face timbers and fenders were replaced, and fender piles were driven 10 feet apart along both faces of the approach.

General repairs were effected to the pier in 1896-7 at a cost of \$1,008.27. The face timbers, fenders and cap pieces were renewed wherever broken or decayed, and the sloping faces of the head block and of the approach were resheathed. During the year 1898 the flooring of the pier was completely renewed with 3 inch hemlock deals, and general repairs were effected, at a cost of \$531.30.

During the fiscal year 1899, the stone "talus" in front of the wharf, which had been carried away by ice, was rebuilt.

The work was done by day labour, at a cost of \$558.77.

The total amount expended on this work is \$13,873.98, \$11,918.37 being for construction, and \$1,955.61 for repairs.

## LAPRAIRIE.

Laprairie is the chief town of the county of the same name, and is situated on the south shore of the River St. Lawrence, 7 miles above Montreal. It contains churches for the Episcopalians and Roman Catholics, a convent, an orphans' home, a foundry, a saw and carding mill, a brickyard, telegraph office, eight hotels and about twenty stores. A steam ferry runs between Laprairie and Montreal, making several trips a day. The population is about 2,500. It is a beautiful spot, near Lachine Rapids, much frequented in the summer.

The Government has undertaken to protect Laprairie from the disastrous effects of the spring floods and ice shoves of the St. Lawrence by constructing ice breaking piers, a revetment wall of cribwork some 1,650 feet long and 20 feet wide along the shore of the river in front of the town, and an earth embankment 1,600 feet long at its upper limit. These works, commenced in 1886-7 and conti-



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nued every year since, are completed, and are certainly a good protection to the town.

In 1886-7 two ice piers were built about 250 feet apart at the upper end of the town facing the St. Lawrence River, to prevent damage being done to property during the breaking up of the ice in the spring. The piers have proved very effective and cost \$6,736.19. In 1887-8, to prevent a repetition of the past disastrous floods, an earth embankment was constructed inward from the shore for a length of 1,600 feet at the western limit of the town. A cribwork retaining wall was also built for a length of 480 feet half way between the eastern ice breaker and the Richelieu Company's wharf. This wall is 20 feet wide, 10 feet high from low water mark and is filled principally with stone, and cost \$4,989.75. In 1888-9, another cribwork retaining wall 335 feet in length from the Richelieu wharf, westward, was commenced and completed to a height of 16 feet above low water mark during the year 1889-90, at a cost of \$7,560.52. It is built of open work, 20 feet in width, with a batter of one in twelve on the outer face. In 1890-1, some general work was done in sheathing the walls previously built, at a cost of \$658.58. In 1891-2 the retaining wall at the lower end of the town adjoining the Richelieu wharf, was extended a further distance of 131 feet at a cost of \$2,495.10. In 1892-3, a further extension to the wall 420 feet long was built, to a height of 8 feet above low water mark, at a cost of \$2,589.51. In 1893-4 the remaining portion of the wall built between the eastern ice breaker and the Richelieu wharf, 284 feet in length, was completed to a height of 10 feet, at a cost of \$2,387.39. In 1895-6 the sum of \$2,015.51 was expended in constructing a stone protection work between the two ice breakers, the distance being 250 feet, and raising a portion of the retaining wall to an elevation of 16 feet above low water mark. In 1896-7, 387 feet in length of cribwork wall was raised to the level of 16 feet, at a cost of \$4,400.36. In 1897-8 the revetment wall was completed to a height of 12 feet above low water mark, at a cost of \$5,640.64. The whole of this work is built of round logs and filled with stone, and sheathed with 3-inch pine planks. During May and June, 1899, the earth embankment at the southwest of the village, in connection with the protection wall, has been raised from one to two feet to the level of the said protection wall, on a distance of 1,000 feet; the rip-rap from the ice breaker to the embankment, which was badly damaged, has been renewed and put in good condition. The work was done by day labour at a cost of \$1,659.86.

The total cost of this work is \$41,133.41.

During the fiscal year 1886-7 .....	\$ 6,736 19
" " 1887-8 .....	4,989 75
" " 1888-9 .....	7,560 52
" " 1890-1 .....	658 58
" " 1891-2 .....	2,495 10
" " 1892-3 .....	2,589 51
" " 1893-4 .....	2,387 39
" " 1894-6 .....	2,015 51
" " 1896-7 .....	4,400 36
" " 1897-8 .....	5,640 64
" " 1898-9 .....	1,659 86

Total ..... \$41,133 41

## LES EBOULEMENTS.

The village of Les Eboulements, in the county of Charlevoix, with a population of about 900, is situated on the north shore of the St. Lawrence, 72 miles

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east of Quebec; the place is somewhat frequented as a summer resort. Spring tides rise 20 feet, neap tides, 13 feet.

*Construction.*—In order to accommodate the passenger and freight traffic of the locality, which is without railway communication, a landing pier was built 3 miles from the village, in 1853, at a cost of \$65,531.52. The pier was built 890 feet long, 30 feet wide throughout, with its head in 10 feet of water at low water spring tides, it has, however, considerably filled, at the present time a depth of only 8 feet is found at low water spring tides. The pier is built with close-face timber and stone ballast; it has a landing slip on each side and at the end.

In 1875 a wing 50 feet long and 42 feet wide was constructed on the eastern side of the head, in order to give a longer mooring face, at a cost of \$5,773.97.

In 1883 an open shed was built at the end of the pier over the slip, at a cost of \$250.

In 1885 a triangular crib was built inside of the wing built in 1875, to give more room for passengers and freight, a movable slip was also constructed during the same year; the amount expended being \$2,198.56.

*Repairs.*—The cost of repairs effected to the structure, since its construction in 1853 until 1882, inclusive, was \$9,676.34. Since then, owing to the strong action of the ice and the wear and tear due to heavy traffic, annual repairs have been required and executed up to 1898, inclusively, for an amount of \$6,861.33.

During the fiscal year 1899 the work of renewing the top part of the pier, for a height of 4 feet was commenced, the shore end was renewed on a length of 490 feet, including face-timbers, cross and longitudinal ties, stringers and planking; the movable slip was repaired and four tiers of timber on the side of the slip were renewed, as well as three maple fenders, 12 x 12, on the outer face; the western side, outer end, has been sheathed with 6-inch maple, on a length of 148 feet, and 7 snubbing posts have been renewed. The work was done by day labour, at a cost of \$1,502.94.

During the last fiscal year the work of renewing the top part of the pier was continued and completed; the slip on the western side was repaired, stringers and planking being renewed and the railing on the east side was rebuilt on a length of 200 feet.

The work was done by day labour in the months of September and October at a cost of \$3,624.59.

The total amount expended on this work is \$95,419.25, viz:—

Construction before Confederation.....	\$65,531 52
Extension and improvements since Confederation..	8,222 53
Repairs.....	16,537 67
Renewals.....	5,127 53
	<hr/>
	\$95,419 25

This work was transferred to control of Department of Marine and Fisheries on 4th September, 1894.

#### LES ECUREUILS.

The village of Les Ecureuils is in the county of Portneuf, on the north shore of the St. Lawrence, 25 miles above Quebec. Spring tides rise 17 feet, neap tides 10 feet.

*Construction.*—During the year 1882 a small landing pier was constructed opposite the village at a cost of \$1,517.13. The pier consists of an outer block 30 feet long by 20 feet wide and an inner block 52 feet long by 20 feet wide, both built of timber crib work filled with stone ballast and placed at a distance of 22 feet apart, connected by stringers supporting the top floor and forming a total length of 104 feet. The pier is dry at low tide but at high water spring tides

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there is a depth of 12 feet at its outer end. In 1883, some damage having been caused by ice, the sum of \$434.45 was expended in rebuilding part of the structure.

*Repairs.*—In 1886 the sum of \$200.00 was expended in repairing the approach which had been partly carried away by the waves. In 1894 the floor stringers and flooring were renewed as well as the corner sheathing and the fenders on each side, at a cost of \$398.45.

During the last fiscal year the top of the pier was renewed on a height of 3 feet including face timbers, cross ties and floor stringers, the western side, inner end, where the earth approach had been washed away, was rebuilt with timber for a height of 8 feet, 50 feet long and filled with gravel and sand, the slip at the outer end was rebuilt. The work was done by day labour at a cost of \$841.73.

The total amount expended on this work is \$3,445.76, as follows:—

Construction.....	\$2,005 58
Repairs.....	1,440 18
	<hr/>
	\$3,445 76

## LEVIS FERRY WHARF.

Levis Ferry wharf is situated on the west side of the entrance of the graving dock.

Spring tides rise 19 feet, neaps 14 feet.

In 1892 extensive repairs were made.

## L'ISLET.

The village of l'Islet, in the county of the same name, is on the south shore of the St. Lawrence, 47 miles below Quebec. Spring tides rise 20 feet, neap tides 13 feet.

*Construction.*—In order to accommodate the extensive lumber trade and traffic in general merchandise of the locality, a landing pier was completed in 1855 at a cost of \$113,343 27. The structure is 1,082 feet long and 31 feet wide, with a head block 56 feet long, 116 feet wide and 34 feet high. The depth of water along the outer face of the block is 8 feet at low water spring tides. During the fiscal year 1899, in order to facilitate the unloading of schooners safely under shelter from all winds, a small pier was constructed in the bay on the west side of the shore end of the main pier: the length of the new work is 150 feet, in a western direction, from the stone wall forming the side of the road leading to the main pier, the western end is 15 feet wide for a length of 60 feet, and for the remaining length of 90 feet the width extends to the high rock on the north side, it has a height of 13 feet from the bottom at the outer end and 10 feet at the inner end; the depth of water along the southern face is 9 feet at high water spring tides. The pier is built with open-faced flatted timbers, 10 inches thick, which, for a height of 8 feet on top, consist of cedar. The southern face is sheathed with 3-inch spruce deals, and birch fenders, 6 x 10 inches, are placed every 10 feet, the corners are protected with 6 x 10 inches birch sheathing, it is entirely filled with stone ballast and planked over with 3-inch deals. The work was done by contract in the month of June 1899, at a cost, including superintendence and purchase of land, of \$1,474.

*Repairs.*—The repairs effected to the main structure, before and up to 1875, amounted to \$3,590.85. In 1876 a complete restoration of the pier was commenced and completed in 1879, the amount expended being \$21,613.36. The superstructure for six or seven courses was taken down and rebuilt with new face timbers, cross ties and longitudinals, and completely filled with stone ballast where required. The shore end of the structure, which was lower than its head and over which heavy seas would break, rendering it dangerous, was raised.

Two sidewalks, each 6 feet wide, were laid from end to end of the pier, and the ships put in good order. From 1880 to 1883 sundry repairs were made to the face timbers, &c., at a cost of \$1,361.23. In 1893 the sum of \$6,190.34 was expended in renewing the floor stringers, flooring, cap timbers, fenders, &c., over the whole structure, and in general repairs to the slip and stairways. In 1894 and 1897 the sum of \$21.55 and \$396.80 respectively were expended for sundry repairs. In 1898 the face of the slip was sheathed with spruce 8 inches in thickness, the stairway on the western side of head block was repaired, 100 planks in the sidewalk were renewed, and the roadway was levelled with sand and gravel. The work was done at a cost of \$211.63.

The total amount expended on the work is \$148,203.03, as follows:—

During the last fiscal year, the outer face of the head block was sheathed with 6-inch birch timber on a length of 115 feet and 14 feet high, some minor repairs were effected to the flooring and earth approach. The work was done by day labour during the months of May and June, at a cost of \$999.99.

The total amount expended on this work is \$149,203.02, as follows:—

Construction before confederation.....	\$113,343 27
Improvements and reconstruction of superstructure ..	23,087 36
Repairs .....	12,772 39
Total.....	\$149,203 02

This work was transferred to control of Department of Marine and Fisheries on 3th February 1893.

#### LONG SAULT.

Long Sault is situated near the foot of Lake Temiscamingue about 36 miles from Mattawa.

This wharf with a piece of land 50 by 100 feet was purchased from Lake Temiscamingue Colonization Ry. Co. in 1889 for \$800.00.

Total expenditure to 30th June, 1900, \$3,373.41.

#### LONGUEUIL.

The town of Longueuil, the *chef-lieu* of the county of Chambly, is situated on the south shore of the River St. Lawrence, nearly opposite the eastern end of the City of Montreal.

*Construction.*—The Richelieu and Ontario Company own a wharf at the upper end of the town, but its long distance from the business or center portion and the increasing trade demanded new wharfing accommodation. At the request of the town council, the department therefore decided in 1886 to build a landing pier at the foot of Alexander Street. In November 1886, a contract was entered into for the construction of the outer portion of the pier, which was commenced at a distance of 675 feet from shore. It consisted of a close-faced cribwork structure, 430 feet long and a uniform width of 20 feet, apart from its outer 90 feet, which was 30 feet wide. It was completed in 1888 at a cost of \$12,491.66. In October 1889, another contract was entered into for the construction of a block 40 feet long and 50 feet wide along the lower face of the existing pier at its outer end, and of a close-faced cribwork extension to shore, 675 feet long and 20 feet wide, with six buttresses 10 feet wide along its lower face. The work was completed in 1891, at a cost of \$16,248.30. The landing pier was then, 1,105 feet in length, including the block at the outer end, which was 40 feet long and 80 feet wide; the first 90 feet of the pier adjoining the block was 30 feet wide, and the remaining 975 feet to shore, 20 feet wide. The outer face of the block was 16½

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feet high above the bottom of the river, and stood in seven feet of water at extreme low water level.

*Repairs.*—The portion of the pier completed in 1888 was damaged by ice in the spring of 1889, which necessitated an expenditure of \$1,517.77 for repairs. In 1892 the departmental dredge *St. Louis* commenced work at the head of the pier, but found the material too hard for her machinery, and after removing 45 cubic yards of hard-pan, at a cost of \$24, she ceased work. During the spring of 1892 the head of the pier was damaged, and the block 40 by 50 feet built in 1890 was carried 10 feet down stream. The opening was filled with cribwork and the plank covering was removed and replaced with stone and gravel at a cost of \$2,196.63. In the spring of 1893 the head of the pier with the adjoining 180 feet was moved bodily 13 feet down stream by the ice. In order to give additional weight to that portion of the pier, which is the most exposed to the action of drift ice, it was decided to widen it by means of cribwork built at an angle with the approach, and on a line from the lower inner corner of the head block to the outer corner of the first buttress, a distance of 354 feet, and to fill with earth and stones the area thus inclosed. A portion of this work was carried out in 1894, when a crib 250 feet long, 12 feet wide and of an average height of 13 feet, was built in the position above described, and the area between it and the original structure filled level with the top of the pier. The work was done by day labour at a cost of \$2,948.70. In 1895 the remaining portion, 104 feet in length, of the work commenced in 1894 was completed, and the spaces between the buttresses were filled with close-faced cribwork in order to better enable the work to resist the action of the ice. The expenditure incurred was \$4,214.19. In 1896 some necessary repairs were performed to the sheathing and face timbers of the upper face of the pier at its outer end, and a gravel roadway 12 feet wide was laid from end to end of the structure, at a cost of \$284.11. Minor repairs were effected to the roadway in 1897 at a cost of \$284.56 and during 1897-98 the roadway was again repaired at a cost of \$160.66. The pier is now 1,105 feet long and reaches a depth of 7 feet at the lowest stage of the St. Lawrence. It is 30 feet wide for the first 700 feet from shore and from 30 to 90 feet wide for the remaining 405 feet, which constitutes the head of the structure. Extensive repairs were required to the upper face of the work at its outer end, which had been almost completely broken up by the ice.

During the fiscal year 1898-9 extensive repairs were performed to the upper face of the wharf at its outer end, which had been almost completely broken up by ice. The damaged portion was removed and rebuilt with close-faced timber 220 feet long, 20 feet wide and 18 feet high. A wing, 50 feet long, 20 feet wide, terminated at its upper end by ice-breaker 26 feet high, was built on the western side of the wharf at its outer end and at right angles with it. The structure is of close-faced cribwork, filled with stone ballast.

As the whole structure had unevenly settled, it was raised 1 to 3 feet, and the filling with stone and gravel was not completed at the end of the fiscal year.

The work was done by day labour at a cost of \$9,986.59.

During the past fiscal year, (1899-1900) the work was continued in July and completed in September, at a cost of \$2,017.21.

The total amount expended on this work is \$52,674.38 as follows:

Construction .....	\$28,739 96
Repairs .....	11,930 62
Reconstruction of outer end, construction of ice-breaker and general repairs.....	12,003 80
	<hr/>
	\$52,674 38

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## LOTBINIÈRE

The village of Lotbinière, in the county of the same name, is situated on the south shore of the St. Lawrence, about 40 miles above Quebec. It has no railway communication and entirely depends for exchange of supplies on bateaux and market steamers from Quebec. Spring tides rise  $14\frac{1}{2}$  feet; neap tides,  $8\frac{1}{2}$  feet. A landing pier was built at this place in 1865 by the municipality, but it was soon destroyed by the heavy ice shoves. Since that time a dangerous and inconvenient trestle structure, removable in winter, has been maintained by the steamboat company. In order to provide more suitable and permanent landing facilities, an isolated block was built during the year 1897 at a distance of 500 feet from high water line. The work was done by contract at a cost, including superintendence, of \$5,284.60, and was completed in October. It is a solid close-faced cribwork structure, 75 feet long, 25 feet wide at the top, and 96 feet 4 inches wide at the base. Its upstream end and inner face are built on a slope of 1 in 1, and its outer and lower faces are battered 1 in 12. The top of the upstream end of the work, for a length of 15 feet, stands 19 feet above the level of extreme low water spring tides, the height of the remaining 60 feet being 16 feet above the same level. The depth of water along the outer face of the work is  $1\frac{1}{2}$  feet at extreme low water spring tides. The work was substantially built of 12 by 12 inch timber, sheathed on its slope with 9-inch hemlock, on its two outer faces with the same kind of timber 4 inches in thickness, and filled with stone ballast. It has successfully withstood the action of the ice shoves. The block is connected to the shore by trestle work which has to be removed in the fall and replaced in the spring; in the month of May 1899, the trestles were placed at a cost of \$188.92.

The total amount expended on this work is \$5,473.52, of which \$5,284.60 for the construction, and \$188.92 for maintenance.

## LOURDES.

Lourdes is situated on the south-eastern corner of Lake Megantic, in the County of Compton. In 1883-4, a small wharf 190 feet long was built at a cost of \$1,194.71. In 1889-90, some slight repairs were made at a cost of \$169.68. In 1890-91 it was damaged by an ice shove and was repaired at a cost of \$500.00.

The total amount expended on this work is \$1,864.39 as follows:—

Construction.....	\$1,194 71
Repairs, etc. ....	669 68
	<hr/>
	\$1,864 39

## MAGOG.

The town of Magog, in the County of Stanstead, is situate at the outlet of the Magog River from Lake Memphremagog, and is a station on the Canadian Pacific Railway. It is a sub-port of entry and contains saw, grist and cotton mills and carriage factories.

In order to accommodate the local trade, a landing pier was purchased in August, 1875, for the sum of \$2,500. It is situate opposite the railway station, and is a pile structure 430 feet long, 24 feet wide for the first 305 feet from shore and 40 feet wide for the remaining 125 feet. Its head is  $12\frac{1}{2}$  feet high above the bottom of the lake and stands in  $7\frac{1}{2}$  feet of water at low water.

*Repairs.*—In 1896-97, the most urgent repairs to the flooring were effected at a cost of \$154.82. During the year 1899 a number of broken planks in the flooring were renewed at a cost of \$42.85. The pier still requires extensive repairs to place it in good order for shipping and landing purposes.

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In 1899-1900 extensive repairs were made, comprising the renewal of three fourth of the flooring, a number of stringers, and some piles were also renewed, a new store house was built and a guard railing was placed, at a total cost of \$530.07.

The total amount expended on this work is \$3,227.74, which includes the purchase price, \$2,500.00 and \$727.74 for repairs.

## MATANE.

The village of Matane, in the county of Rimouski, is situated on the south shore of the St. Lawrence, at the mouth of the Matane River, 240 miles below Quebec, and 30 miles by way of Little Metis from St. Octave, the nearest point on the Intercolonial railway. It contains several saw and grist mills and 1 spool factory. Spring tides rise 14 feet; neap tides, 6'70.

*Construction*—In 1879 a sum of \$10,000.00 was appropriated for the construction of a landing pier, and was expended by day labour by a syndicate appointed by the municipal authorities under the supervision of the department. The pier is built at the mouth of the Matane River along its western shore, and runs parallel to its channel. It consists of 10 cribs 30 feet wide, placed 25 feet apart, and connected by platforms. The lengths of the cribs are: one of 60 feet, four of 30 feet and five of 15 feet, making a total length of 480 feet. The pier is dry at low water, but has six feet of water at its outer end at one-third flood, and 15½ feet at high water spring tides. A further sum of \$72.43 was expended on this work in 1880.

In order to prevent the sand from passing through the spaces left between the cribs, into the channel of the river, these openings were closed in 1882 and 1883 with rows of close piling driven along the eastern face of the work. The unprotected corners of the cribwork which had been damaged by ice were repaired. The total amount expended during the two years was \$5,358.36. In 1884 pile protection works were commenced along the east shore of the river to prevent the inflow of sand into its channel. The amount expended was \$199.19. The works were completed in 1887, when a further sum of \$500.21 was expended.

In 1886 a landing pier 60 feet long, 30 feet wide and about 20 feet high was built at the lower outer corner of Messrs Price Brothers' wharf at a cost of \$1,499.75. In 1892 it was connected to the shore by a block and span structure, 160 ft. long and 12 feet wide, and the pier itself was raised and general repairs effected at a cost of \$1,261.79. In 1893 an extension 185 feet long and 30 feet wide, was commenced to the pier constructed in 1886. The work was completed in 1894 at a cost of \$4,183.83. It consists of four cribs 20 feet long and 30 feet wide and of an average height of 20 feet, placed 25 feet apart and connected by platforms. The landing pier is now 245 feet long 30 feet wide and of an average height of 20 feet. The depth of water at its head which was five feet at low water spring tides at the time the work was completed, has since shoaled to one foot.

In order to prevent, by scouring, the accumulation of sand in the channel of the river, it was decided, during the year 1897 to connect the two existing works by a continuous structure. Plans were therefore prepared for a training pier, 640 feet long and 20 feet wide, built of pilework, close faced on its channel side, and floored on a width of 12 ft. so as to make it available as a landing pier. Tenders were called for the work, which was not, however, carried out owing to objections raised by some of the residents. The only amount expended was \$160.68 for printing and advertising.

*Repairs.*—In 1885 the cribs which form the pier built on the western shore of the river at its mouth were repaired. The expenditure being \$540.97. In 1895 and 1896 the same structure was thoroughly repaired. The piles placed along its eastern face in 1882 had all been broken by ice and carried away, and the corner of the cribs, which the removal of the piles had left unprotected, had been badly

damaged. General repairs were therefore effected to the piers, a new row of piles 10 inches square was driven along the whole face of the work, which was further protected by large stones deposited along its base. The work was done by day labour at a cost of \$1,547.94.

During the year 1899 a sum of \$396.22 was expended in sheathing the outer end of the same work.

Notwithstanding the frequent repairs effected to the various Government works at Matane, repairs which at times amounted to partial reconstruction, they are all in very bad condition due to the action of the ice. The pile protection works built on the east shore of the river have entirely disappeared; the landing pier at the mouth of the river has again been damaged by ice, and the one adjoining Messrs. Price Brothers' wharf is in a delapidated condition.

The total expenditure on this work since 1879 is \$30,721.37, as follows:—

Construction and improvements.....	\$28,236 24
Repairs .....	2,485 13
Total.....	\$30,721 37

#### MISTASSINI.

Mistassini, county of Chicoutimi, is a settlement on the river of the same name, near its confluence with "Rivière au Foin," or Rivière Mistassini, being 36 miles to the northward of Roberval on the west side of Lake St. John, and 18 miles above the mouth of River Mistassini on this lake. Besides the parish church, there is in the locality a monastery of Trappist Fathers; also a grist-mill, a saw-mill and a cheese factory: Population 400. The side-wheel steamer "Colon," drawing 3½ feet of water and carrying 200 passengers, and a considerable quantity of freight, is subsidized by the local Government, and calls regularly, twice a week, during the season of navigation. In 1896-97, a public wharf was built for the accommodation of the rapidly increasing number of settlers on the fertile land around Lake St. John, on the east side of River Mistassini, immediately above its junction with Rivière au Foin. The structure consists of a fully ballasted close-faced timber crib 30 feet long 30 feet wide and 20 feet high at the outer end, which is floored over with 3 inch plank; along the outer face there is a depth of 5 feet at low water. Amount expended, \$681.04. In 1897-98 a further amount of \$150 was expended to build a combined freight and shelter shed 25 feet by 30 feet, at the end of the wharf. An amount of \$23 84 was also paid for sundry accounts. Amount expended \$173.84.

Total cost of construction, \$854 88.

Total expenditure to 30th June 1900 is \$1,354.88.

#### MONTMAGNY (ST. THOMAS)

The town of Montmagny, in the county of the same name, is situate on the south shore of the St. Lawrence, on the Intercolonial railway, 40 miles below Quebec. The Rivière du Sud flows through the middle of the town. Spring tides rise 20 feet; neap tides, 13 feet.

*Construction.*—In 1879-80 an isolated block, 30 feet square, was built in five feet of water at low water spring tides, on the west side of the basin, within the mouth of the Rivière du Sud and three-quarters of a mile from the town. The cost of the structure was \$1,513.09. In 1881 the block was extended shorewards 25 feet and an approach 150 feet long and 24 feet wide was built to shore at a cost of \$3,743.89. In August, 1896, the superstructure of the work was burnt down to seven feet below the top of the flooring, and the lighthouse, which had been erected upon it by the Department of Marine and Fisheries, was also



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destroyed. The superstructure was rebuilt in 1897, and the work fully ballasted where required. A small waiting room was also erected at the shore end of the pier, a lighthouse built on its outer end, and the approaches repaired. Total expenditure, \$4,046.51. The pier is now 205 feet long; the outer 55 feet are 30 feet wide, and the remaining 150 feet, 24 feet wide. The depth of water along its outer end is  $3\frac{1}{2}$  feet at low water spring tides.

*Repairs.*—From 1883 to 1886 an amount of \$2,607.96 was expended on repairs to the pier and to the roadway leading thereto. In 1887 a number of boulders was removed from the bed of the Rivière du Sud in the vicinity of the head of the pier at a cost of \$1,999.69. In 1889-90-93 and 1894 sundry repairs to the flooring, corner sheathing, cap pieces, etc., were effected at an aggregate cost of \$379.50. During the last year the waiting room was repaired and painted at a cost of \$52.46.

Total expenditure to 30 June 1900 is as follows :—

Construction and improvements . . . . .	\$11,303 43
Repairs . . . . .	2,987 46
Total . . . . .	<u>\$14,290 89</u>

## MURRAY BAY.

Murray Bay, or Malbaie, is one of the best known and most frequented summer resorts of the north shore of the St. Lawrence, in the county of Charlevoix,  $83\frac{1}{2}$  miles below Quebec. The village is situate on both sides of the mouth of the River Malbaie, which empties into a bay one mile deep and about  $2\frac{1}{2}$  miles wide at its entrance. At low tide the bay is dry, with the exception of small channels through which the river discharges. The steamers of the Richelieu and Ontario Navigation Company call here daily, and a heavy traffic is done. Spring tides rise 20 feet. Neap tides, 12 feet.

*Construction.*—In 1855 a landing pier was built off a projecting rock, called Pointe au Pic, situate on the west shore of the bay, three miles from the village, at a cost of \$53,487 20. It was 170 feet long and  $30\frac{1}{2}$  feet wide, with the exception of its outer 70 feet which was 108 feet wide. Its head, which was 36 feet in height, stood in 12 feet of water at low water spring tides. In 1876 an extension 30 feet long, 108 feet wide and 42 feet high, reaching to a depth of 18 feet at low water spring tides, was built along the outer face of the pier at a cost of \$14,021.04. In 1883 a moveable slip was placed in the outer face of the structure to accommodate the landing of passengers and freight at all times of the tide, at a cost of \$448.06. In 1884 a shed was built to cover the landing slip and a portion of the head of the wharf at a cost of \$1,099.11. In 1894 an extension 40 feet long, 35 feet wide and 50 feet high was built along the western face of the pier, at its head, the total expenditure being \$5,675.35. The pier is now 500 feet long from end to end. Its landing face is 143 feet long and stands in from 18 to 26 feet of water at low water spring tides. It is built entirely of close faced crib-work, with timber 12 x 12 inches dimensions, and filled with stone ballast. Its cross ties and longitudinal are round logs not less than 14 inches diameter at the small end.

*Repairs.*—The cost of repairs effected to the structure since its construction in 1855 until 1882, inclusively, was \$3,916.00. Since then, however, and owing to the strong action of the ice and the considerable wear and tear due to heavy traffic, annual repairs have been required and executed at a cost, up to 1897 inclusively, of \$8,074.81. During the year 1898 the western side and front of the west wing were sheathed with 7-inch rock elm and the main body of the pier was also partly sheathed with 3-inch spruce. The flooring was repaired

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in places, and two face-timbers at the inner end of the structure were renewed. The work was performed by day labour at a cost of \$484.16.

During the last fiscal year the winches, chains and pulleys used in raising and lowering the slip and which had become worn out and dangerous, were renewed at a cost of \$275.74.

The total expenditure on this work is \$87,431.47, as follows:—

Construction before Confederation.....	\$53,487.20
Extensions and improvements since Confederation.....	21,243.56
Repairs.....	12,700.71

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\$87,431.47

This wharf was transferred to control of Department of Marine and Fisheries on 15th August, 1893.

#### NEW CARLISLE.

New Carlisle on the north shore of the Baie des Chaleurs, is the chief town of the County of Bonaventure, distant 65 miles from Campbellton, N B

In 1882 the work of constructing the pier at this place was actively prosecuted, and with the sum appropriated for expenditure during 1882-83, it was expected that the work would be brought to completion.

In 1883, the pier was extended to 300 feet in length, scouring took place making 22 instead of 14 feet at low water, the work sank and was built up to its former height.

A pier 606 feet long and from 29 feet to 49 feet wide, reaching 15 feet depth at low water springs, has been built at this place by the department, between 1881 and 1883, for general landing and shipping purposes. This work was much strengthened, partly re-filled with ballast, and otherwise improved during succeeding years, and in 1890-91 a head block was added measuring 51½ feet in width at the inner and 32 feet at the outer end, and 70 feet in length on an average, and having a depth of 16 to 17 feet along its outer face at low water spring tides. Springs have here a range of 6½ feet and neaps 3½ feet.

The appropriation of \$850 made by Parliament at its session of 1897, for repairs to this pier, has been applied as follows:—

1. The head of the pier, which had sunk some 2½ feet was levelled up to the height of the inner portion, over an area of 74 feet long by 40½ feet wide, viz:—to 5 feet above high water level.

2. A wooden building, 24 feet by 34 feet, was erected and fitted up as a combined freight shed and waiting room, with office for agent, etc. This was a much needed improvement, as, when not immediately removed, the freight deposited on the pier is often damaged, owing to the absence of proper shelter, and passengers for the steamer "Admiral" are at times, more especially in the fall of the year, much inconvenienced for want of a suitable waiting room.

3. Sundry repairs required to flooring and slips were attended to,

Total actual expenditure incurred, \$849.87.

During last fiscal year the sum of \$2,000.00 was expended in renewing the entire flooring on the old part of the New Carlisle wharf which was built previous to 1889.

The shore end was built up on trestle work, to meet a rise of 7 feet over the original flooring, caused by the railway crossing at shore end calling for a clear height of 22 feet under planking.

Guard rails and cap timbers are placed all over on both sides. All the old cedar stringers in work from 1883-84-85 were found sound but all the spruce had to be replaced. The west half on a length of about 400 feet had to be made doubly strong on account of the permission given the Lake Superior and A. R. R.

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to place track on wharf. 7,700 feet of square and round cedar were used in effecting these repairs.

## NEWPORT.

The village of Newport, in the county of Gaspé, is situated at the mouth of the river of the same name, on the north shore of the Baie des Chaleurs, 88 miles east of Campbellton, N.B., and 50 miles west of Caplan. Spring tides rise  $4\frac{1}{2}$  feet; neap tides,  $2\frac{1}{2}$  feet. The population of the village is extensively engaged in fishing, which is carried on almost to the exclusion of all other pursuits.

*Construction.*—In order to provide a harbour of refuge for fishing boats, and affording them easy access into the river and up to the bridge on the public highway, it was decided, in 1884, to improve the mouth of the river by excavating and the construction of suitable works. The works were not, however, completed until 1887, when a sum of \$2,778.79 was expended. They consisted of two parallel piers placed 20 feet apart; the west pier was 75 feet long, 12 feet wide, and of an average height of 8 feet; the east pier which was originally 140 feet long, 12 feet wide, and 10 feet high, was extended 90 feet and widened to 20 feet on its whole length, in 1889 and 1890, at a cost of \$3,672.03.

*Repairs.*—In 1891 general repairs were effected to the piers at a cost of \$450. During the year 1898 the sum of \$26.53 was expended for minor repairs.

During the fiscal year ended June 30 1899, the sum of \$244.48 was spent in some small repairs to enable the fishermen to get through the season's fishing (1898).

Material, iron &c were purchased during the past fiscal year for the construction of a proposed new breakwater.

For want of proper timber the construction had to be postponed until next year.

The total amount expended on these works is \$8,663.27, as follows:—

Construction.....	\$6,450 82
Repairs.....	721 01
New breakwater.....	1,491 44
	<hr/>
	\$8,663 27

## NICOLET.

The River Nicolet empties into the St. Lawrence on its southern shore, at the foot of Lake St. Peter.

In order to protect the schooners loading in the harbour from the force of storms on Lake St. Peter, a jetty was commenced in 1881 and added to each consecutive year.

This work, in 1891, was resumed on the 29th September, the water having been too high to admit of its being commenced before.

The pile-work was discontinued on the 14th October, and the stone filling at the end of November. During this time 200 feet of pile-work were built, making the jetty 3,762 feet in length. It is 13 feet 2 inches in width, and 4 feet above low water, with an average height of 5 feet 6 inches.

Some dredging was done in the channel along the jetty, between the 24th September and the 28th October 1891, the quantity removed amounting to 11,502 cubic yards of sand.

Some damage was caused to the jetty at the beginning of December 1891, about 200 feet of the outer part having been carried away. The remaining section was repaired in the spring at a cost of \$1,815.77.

Repairs have been made and dredging done yearly since 1882.

Total expenditure to 30th June 1900, including dredging, is \$148,780.54.

## PERCÉ.

Percé, Gaspé County, is the *chef lieu* of the District of Gaspé.

The landing pier commenced in winter of 1888 was completed in May 1889. It was built by contract and its dimensions are : length over all on top 320 feet ; width on top 20 feet ; height at outer end  $36\frac{1}{2}$  feet of which  $26\frac{1}{2}$  feet only are above the bed of the river, it having settled down some 10 feet during construction ; depth of water at outer end is 16 feet at low water spring tides, with a rise and fall of from 5 feet to 5 feet 6 inches in full spring tides and 3 feet ordinary neap tides.

## PERIBONKA.

Peribonka is a small village situated at the mouth of the river of the same name on the northern side of Lake St. John.

During the last fiscal year a new wharf was constructed at this place, consisting of a crib 20 by 30 feet and 22 feet high, with a depth of 5 feet at low water at the outer end.

The amount expended during the year was \$1,299.31.

## PHILLIPSBURG.

The village of Phillipsburg is situated on the east shore of Missisquoi Bay, Lake Champlain, in the county of Missisquoi.

*Construction.*—In the session of 1882 the sum of \$4,000 was granted towards the construction of a landing pier, the municipality to furnish a like amount ; a survey was made at a cost of \$185.75, which was the only expenditure incurred. A further sum of \$32.79 was expended in 1884 for examination in connection with the proposed landing. Owing, however, to the refusal of the municipality to grant its share of the estimated cost of the proposed structure, the work was not carried out, and the scheme was abandoned until 1894, when a new survey was made at a cost of \$108.42. In 1895 borings were taken over the site of the proposed structure at a cost of \$165.94, and on the 29th of July, 1895, a contract was entered into for its construction, the municipality having subscribed \$4,000 towards its cost. The work was completed in 1897, at a cost of \$11,142.89. It consists of a breakwater or head block 120 feet long and 25 feet wide, of a trestle work approach 302 feet long and 30 feet wide, and of a stone and earth embankment 285 feet long and 30 feet wide at the top, with side slopes of  $1\frac{1}{2}$  to 1. The outer face of the breakwater is  $17\frac{1}{2}$  feet high above the bottom of the bay, and stands in  $7\frac{1}{2}$  feet of water at extreme low water.

*Repairs.*—The embankment was considerably damaged by ice and high water in April, 1897. It was thoroughly repaired during the year 1898, and the ballast chambers along the outer face of the breakwater were filled with stone ballast, at a cost of \$711.79.

The total amount expended on this work is \$12,347.58, \$11,635.79 being for construction and \$711.79 for repairs.

## PIOPOLIS.

Piopolis is a post village in Compton Co., on the west shore of Lake Megantic, 11 miles from Lake Megantic village, on the Canadian Pacific Railway. The wharf at this place was built in 1882-83 at a cost of \$721.60. It is built of solid cribwork filled with stones, with a covering made of gravel. In 1887-88 some small repairs were made to it at a cost of \$77. In 1897-98 a vote of \$2,500 was granted to raise and repair the Government wharfs on Lake Megantic, on account of the rise in the lake level caused by the dam which the Montagne Pulp Co. built in 1895 across the Chaudière River at its outlet from the lake. The wharf

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was repaired and raised five feet above its original height and a covering made to it in gravel at a cost of \$623.05.

The total amount expended on this work is \$1,421.65 as follows :

Construction.....	\$721.60
Repairs .....	77.00
Repairs and improvements.....	623.05
Total.....	\$1,421.65

## POINTE A PIZEAU (SILLERY).

Two miles west of the city of Quebec, on the north shore of the St. Lawrence, a high bluff, called Pointe à Pizeau, projects into the river. On top of this bluff, at an altitude of about 200 feet, are built the church and convent of Sillery, in the village of Sillery.

*Construction.*—In order to facilitate the landing of passengers and freight from the ferry boat, which, in former years, were landed on a wharf used for piling lumber, the municipal council of Sillery transferred over to the Dominion Government a certain beach property on which a pier had been built many years ago, on the condition that the pier be repaired the transfer was effected in 1898. the pier had a length of 404 feet; 24 feet wide at the inner end and 32 feet wide for a length of 104 feet at the outer end, built of open-faced timber cribwork, filled with stone ballast; at low water spring tides there is a depth of 21 feet at the outer face.

During the fiscal year 1899, an angular block of cribwork, 49 feet wide, of a mean length of 58 feet and 43 feet high, was built on the western side of the outer end, in 21 feet of water at low water spring tides, the top part of the old pier was rebuilt for a height of 6 feet, with pine and cedar timber, on a length of 100 feet from the outer face, and has since been completed; the pier is now 444 feet long, 24 feet wide at the inner end, and the outer end for a length of 39 feet, 71 feet wide; it has a movable slip supported by a pontoon.

At the end of the fiscal year the sum of \$5,083.57 had been expended and the repairs completed.

During the last fiscal year the rebuilding of the top pier was continued and a movable slip supported by a pontoon was built at the outer end and a waiting constructed; the work was done by day labour at a cost of \$4,139.48. The total amount expended on this work was \$9,223.05.

## POINTE AUX ESQUIMAUX.

Pointe aux esquimaux, in the united counties of Chicoutimi and Saguenay, is on the southern shore of the River St. Lawrence, 525 miles below Quebec.

The wharf purchased by the Government in 1895 had a length of 125 ft. and a width of 30 feet. During 1895-6 it was lengthened 60 feet by the construction of a block 30 feet square and 42 feet in height, connected with the old work by a platform 30 feet in length, and the whole work was sheathed.

The wharf is now 185 feet in length and a depth of water at its outer end of 25 feet at low water.

## PORT AU PERSIL.

Port au Persil is a small post village in the county of Charlevoix, on the north shore of the St. Lawrence, 100 miles east of Quebec and 15 miles below Murray Bay. Spring tides rise 18 feet, neap tides 12 feet.

The harbour of Port Persil is frequented by 10 schooners owned in the locality

and employed principally in shipping cordwood, the vessels are loaded and unloaded while aground at low tide.

In 1889 the sum of \$498.40 was expended in clearing the harbour of the most dangerous boulders.

During the last fiscal year, in order to facilitate the grounding of schooners in safety at the inner end of the harbour and afford sufficient sheltered space to winter the vessels, the projecting rocks and boulders were cleared over an area of 100 x 100 feet.

The work was done by day labour during the month of October at a cost of \$394.48.

The total amount expended at this place is \$92.88.

#### POINTE CLAIRE.

Pointe Claire, the *chef-lieu* of the county of Jacques-Cartier, is a summer resort on the north shore of Lake St. Louis, 14 miles west of Montreal.

On October 26, 1898, the Government entered into an agreement with the Grand Trunk Railway Co. of Canada, for a lease, for a period of 20 years, of the company's wharf, which is a solid embankment of stone and earth 1,000 feet long, of an average width of 45 feet, situated at the foot of Grand Trunk Avenue.

During the fiscal year 1899 a block of close-faced cribwork, 124 feet long, 24 feet wide and 16 feet high, was built at the end of this wharf and at right angles to it, forming a T: the western end of the block is built on a slope to act as an ice-breaker.

The work was done by day labour at a cost of \$4,022.06.

In 1899-1900, a storehouse was erected on the eastern side of the approach adjoining the head block, and repairs were made to the roadway, from the shore to the head block, at a cost of \$665.25

The total expenditure on this work is as follows:

Construction of head block .....	\$4,022 06
Store house and improvement to road way .....	665 25
Total .....	\$4,687 31

#### PORT DANIEL.

The village of Port Daniel is on the north shore of the Baie des Chaleurs, in the county of Bonaventure, about 75 miles east of Campbellton, N. B., and 45 miles west of Percé. Spring tides rise 6 feet: neap tides, 3 feet.

*Construction.*—During the session of 1886 an appropriation was granted for the construction of a landing pier. The work was executed by contract and completed in 1889, at a cost of \$20,487.58. It was 350 feet long from end to end, 20 feet wide for the first 200 feet, 30 feet wide for the next 100 feet, with a block 50 feet square and 26 feet high at its outer end, which stood in 13 feet of water at low water spring tides. On November 15, 1889, a contract was entered into for the construction of an extension 75 feet long, 50 feet wide and 27 feet high at its outer end, reaching to a depth of 13 feet at low water spring tides; the work was completed in October, 1890, at a cost of \$12,586.44. The pier is 425 feet long, is built throughout of close-faced cribwork with timber 12 by 12-inch dimensions; the cross ties and longitudinals are round logs, not less than 14 inches in diameter at the small end.

*Repairs.*—The extension built in 1890 having settled bodily about 3½ feet, it was found necessary in 1895 to lift up the flooring, some cross ties and longitudinals and to rebuild the structure to the height of the main body of the pier. The work was done by day labour, at a cost of \$998.54.

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Repairs and rebuilding of a similar character had to be effected in 1897 to the main body of the pier, which had settled in places about 3½ feet for a total length of 277 feet. The freight and shelter shed was also removed from its position at the outer end of the original work to the outer end of the extension, and a portion of it was partitioned off and fitted out as a waiting room. The amount expended was \$1,992.75.

During 1898 it was found expedient to complete the levelling up of the shore end of the pier for a length of 82 feet. The work was done by day labour, at a cost of \$170.51.

During the fiscal year 1899 the sum of \$767.89 was expended in filling with stone the undermined portions of the foundation of the wharf, in repairing the south-east outer corner and in renewing a portion of the planking at the outer end.

The total amount expended on the work since it was commenced in 1887 is \$37,003.71.

Construction .....	\$33,074 02
Repairs.....	3,929 69
Total.....	\$37,003 71

## PORT LEWIS.

Port Lewis, in the county of Huntingdon, is situated 51 miles south-west of Montreal, on the south shore of Lake St. Francis.

During the year 1899 a right of way together with an old wharf were bought from Mr. S. Carson for the sum of \$150.

The upper structure of the old wharf, which was entirely dilapidated, was removed to the low water level and rebuilt in solid cribwork for a height of 6 feet. The wharf has a length of 100 feet, parallel with the channel, by a width of 34 feet for 58 feet of its length, and a width of 20 feet for the remaining 42 feet. The depth of water at the outer face is 8 feet. The approach from shore to the wharf is a solid embankment of stone of 75 feet long and 20 feet wide with slopes of one in one on the sides. There has been erected at the angle of the upstream portion of the wharf and the approach a storehouse 20 x 24 feet.

The work was done by day labour, at a total cost, including the price of purchase of the right of way, of \$2,494.47.

## RIMOUSKI.

During the last fiscal year, the slip, on the eastern side of the pier, which had been carried away by ice during the previous winter, was rebuilt on a length of 90 feet, 12 feet wide and 23 feet high and filled with stone ballast, the planking on one side of the pier was renewed on a length of 1,500 feet, with 3 inch spruce planks, the stringers and planking at the outer end for a length of 100 feet, also received some temporary repairs. The work was done during the months of September and October, at a cost of \$2,499.79.

The total amount expended on this work is \$142,265.38, viz:—

Construction before Confederation .....	\$106,944 80
“ since “ .....	13,270 92
Repairs .....	22,049 66
Total.....	\$142,265 38

This wharf was transferred to control of Department of Marine and Fisheries on 29th June 1894.

## RIVIERE DU LIEVRE.

The Rivière du Lièvre flows through the county of Ottawa, and empties into the Ottawa River at Buckingham station, on the Canadian Pacific railway, 18 miles below Ottawa.

The magnitude of the trade and business done on this river, previous to the completion of the lock and dam at Little Rapids, may be judged from the following return of the output of timber and phosphate for the twelve months ended June 30th, 1888 :

Railway ties.....	40,000
Cedar posts.....	30,000
Square timber (cubic feet).....	154,395
Lumber (B.M.).....	46,500,000
Phosphate (tons).....	27,537
Mica (lbs).....	10,000
Feldspar (tons).....	50

The river was then navigable at high water from the village of Buckingham to High Falls, a distance of 22 miles. But, during low water, navigation was practically stopped at the foot of Little Rapids, a distance of 12 miles above the village of Buckingham. Various amounts, aggregating \$10,053.68 were expended from 1881 to 1887, in improving the navigation of the river to High Falls; boulders and ledges of rock were blasted and removed from the bed of the channel through the Long Rapids, situated 7½ miles above the Little Rapids. The channel through the latter was also improved in a similar manner and a floating stage carrying a double-gearred winch, was placed at its head to facilitate the passage of barges carrying phosphate. Notwithstanding those improvements, navigation still remained unsatisfactory. A careful survey of the locality was then made, and it was ascertained that any further deepening of the channel through the Little Rapids would tend to lower the level of the water in the upper reaches of the river, and render the driving of logs impossible at any other time than during the very highest stages of the waters.

*Construction.*—The construction of a lock and dam at the Little Rapids was therefore decided upon and a contract for the execution of the works was entered into with Messrs. Poupore & Co., in December 1886, and completed in April 1892, at a total cost of \$233,658.65.

The lock is situated on the east shore of the river. It is built of cut stone masonry in cement mortar, 150 feet long between the gates, 32 feet 6 inches wide at the bottom with eight feet of water on the mitre sills, and a lift of 13 feet 9 inches at extreme low water. Along the western face of the work a retaining wall was built and was carried 143 feet above the upper end of the latter to serve as a guide pier to the upper entrance. The dam, which is built of close-faced cribwork, is 270 feet long and 34 feet wide at the bottom; it starts from the western face of the retaining wall opposite the upper gates of the lock, and crosses the streams to the western abutment, which is 65 feet long and 40 feet wide. Through its centre a timber slide 18 feet wide was built for the passage of timber and logs, and booms were strung from the opening to mooring piers placed on each shore of the river 290 feet above the dam.

*Repairs.*—During the year 1893-94 some necessary repairs were made to the west abutment of the dam and to the lower wharf at a cost of \$102.65. In 1894-95, \$267.70 was expended in building a protection pier above the west abutment of the dam, to prevent the river from working its way back of this abutment during the spring freshets. In 1895-96 some minor repairs were made in filling holes and depressions in the west embankment, which was sinking in some places and required levelling, at a cost of \$115. In 1896-97, the upper portion of



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the lower entrance wall, which had bulged out about 14 inches for a length of 100 feet from the masonry of the lock, was taken down and a new wall, 135 feet long by 25 feet wide, built in its place. This bulge was getting worse every year, and it was feared that the pressure of the earth backing would soon cause it to collapse and block the lower entrance of the lock.

The crib 43 feet by 22 feet, built at the head of the western abutment, to prevent undermining was also completed. This crib imperfectly fulfilled its object, a quantity of water still making its way underneath the abutment, and it was found necessary to remove this source of danger by adding three feet to the height of the crib, fully ballasting it and sheathing its outer face from top to bottom. The cost of these repairs amounted to \$1,824.39. In 1897-98 the sum of \$4,419.94 was expended in rebuilding the retaining wall from the dam to the upper end of the guide pier, a distance of 226 feet, in close face cribwork from the low water level to an elevation of 10 feet with a width of 26 to 32 feet. This reconstruction was absolutely necessary to protect the lock wall, as the face timbers of the retaining wall were gradually being pressed out by the stone ballast, the dovetails of the cross ties having split and decayed, and the cross ties being bent and broken.

The following is a statement showing the cost of the work, repairs and maintenance and the amounts collected during each year, up to and including the fiscal year, 1897-98.

Year.	Cost of Construction	Repairs and Improvements.	Maintenance.	Revenue.	Remarks.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	
1887-88.	43,329 04	.....	.....	.....	Lock and dam in course of construction.
1888-89.	64,506 74	.....	.....	.....	" " "
1889-90.	50,280 50	.....	.....	.....	" " "
1890-91.	40,019 14	.....	.....	.....	Masonry of lock completed and work on dam progressing rapidly.
1891-92.	35,247 72	.....	193 52	.....	Lock and dam completed and first boat locked on 19th of April.
1892-93.	275 51	.....	952 86	243 87	Building 460 feet of booms.
1893-94.	.....	102 65	768 21	532 59	
1894-95.	.....	267 70	840 34	404 30	
1895-96.	.....	115 00	851 60	230 33	
1896-97.	.....	1,824 39	790 79	198 45	
1897-98.	.....	4,419 94	736 19	246 84	
	223,658 65	6,729 68	5,133 51	1,856 38	

From the foregoing statement it will be seen that the revenue collected has diminished every year, the shrinkage being caused by the suspension of operations on the phosphate mines and the closing up of Messrs. Grondin & Racicot Co.'s saw-mill.

Owing to the flooding of land caused by the construction of the dam, amounts aggregating \$4,559.04 were paid as damages.

The total expenditure incurred in connection with this work is as follows:—

Construction.....	\$233,658 65
Repairs.....	6,729 68
Staff and maintenance.....	5,133 51
Claims for damages, etc.....	4,559 04

Total.....\$250,080 88

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During the year 1893-94, after the construction of the lock, the sum of \$1,244.94 was expended in removing boulders obstructing the channel through the long rapids.

## RIVIÈRE A LA PIPE.

A small village situated on the north shore of Lake St. John at the mouth of the river of the same name, 7 miles north of Grande Décharge.

It contains a Roman Catholic church, two saw mills, one blacksmith shop and three stores. Population 400.

The wharf is situated at a point on lot No. 118, township Taillon, about 1 mile to the westward of Rivière à la Pipe. It is built in a southerly direction about 75 feet from shore for a length of 200 feet and a width of 25 feet and extends to 8 feet depth at the mean summer level of the lake. It is built of close-faced cribwork up to 18 feet during the year 1897-8 and stands 25 feet high when completed.

The wharf will facilitate communication between the northern and southern shores of the lake which are rendered difficult, not only on account of the distances being great by land, but by the state of the roads, or the entire absence of such. The large rivers which flow through the township and territories around Lake St. John also intercept all means of communication and prevent to a certain extent settlement of the lands.

The Quebec Government has built a good road from the public road to the present wharf, a distance of 2 miles. The amount expended at the end of the year 1897-8 was \$3,998.21.

During the fiscal year 1899 an addition 50 feet long by 30 feet wide was built at the outer end of the wharf to facilitate the approach.

During the past fiscal year the outer block was raised 5 feet, sheathed for a length of 120 feet and replanked, 25 toises of stone was also placed in the work at a cost of \$999.68.

Total expenditure to 30th June, 1900 is \$6,997.75.

## RIVIÈRE AU RENARD.

Rivière au Renard is one of the most ancient in the county of Gaspé; it is the first important fishing station and business place met with, proceeding from Gaspé Basin along the south shore up the St. Lawrence. The population is estimated at 1,700.

A small landing pier was constructed in 1895-96.

During the last fiscal year the sum of \$2,870.51 for materials such as timber, iron, plant and tools, freight, storage and other sundry expenses, out of a vote of \$4,000.00 towards the construction of a landing pier and breakwater at Rivière au Renard, Gaspé County.

## RIVIÈRE BLANCHE.

Rivière Blanche flows through the county of Rimouski, and empties into the St. Lawrence on the south shore about 224 miles east of Quebec, 26 miles east of Métis and 9 miles west of Matane.

The public pier built near the mouth of this river consists of a head block of solid cribwork, 120 feet by 24 feet on top and about 21 feet high, which is connected with the shore by a block and span structure, 550 feet long, 20 feet wide and some 18 feet high on an average. This pier is an excellent landing place, accessible, at high tide, to vessels engaged in the coasting trade; spring tides rise 14 feet and neaps 7 feet.

During the month of June, 1897, the sheathing around the head block was renewed with 6 inch black birch 9 feet in height, for a length of 250 feet; the top planking was also partly renewed and new snubbing posts put in; work done by day labour at a cost of \$892.63.

Total expenditure to 30th June, 1900—\$16,960.67.

## RIVIERE DU LOUP, (FRASERVILLE)

The village of Riviere du Loup, now called Fraserville, is the *chef lieu* of the county of Temiscouata, and is situated on the south shore of the St. Lawrence, 114 miles below Quebec. Spring tides rise 19 feet, neap tides 12 feet.

*Construction.*—In 1855 a pier built of close-faced timber cribwork, filled with stone ballast, was completed at the extremity of a point of land called Pointe de la Rivière du Loup, about one mile distant from the village, at a total cost of \$170,129.35. It was 1,641 feet long and of a uniform width of 30 feet, with the exception of the outer 50 feet, which was 124 feet wide. Its head was 42 feet high above the bottom of the river, and stood in 16 feet of water at low water spring tides. In 1884 and 1885 an extension to the head of the pier, 100 feet long, 50 feet wide, and 42 feet high was built by contract at a cost of \$24,158.94. In 1877 a combined waiting room and freight shed was erected on the head of the pier, and some repairs were effected to the hand rail and flooring, at a cost of \$3,169.79. In 1891 a hand railing was constructed on the whole length of the pier along its east side, and some repairs were effected to the flooring at a cost of \$740.40.

*Repairs.*—During the first ten years of confederation \$1,861.86 were expended on minor repairs. In 1879 thorough repairs were commenced on the pier and were completed in 1883 at a cost of \$15,282.93. The structure having sunk to such an extent that the waves washed over it, was raised 3 feet, and a berth for vessels was dredged along its western face to a depth of 16 feet at low water spring tides. The pier was severely damaged by ice in the spring of 1885, necessitating extensive repairs, which were performed in 1886 at a cost of \$9,222.78. Sundry repairs to the face timber, flooring, floor stringers, hand railings and slips were effected every year from 1888 to 1897, inclusive, at a total cost of \$2,756. During the year 1898 the flooring and part of the floor stringers were renewed on a length of 1,150 feet and a width of 30 feet, the portion of the structure under the railway track has been strengthened, 500 feet of capping were renewed, 16 new snubbing post were put in, painted and covered with zinc caps, two ladders were placed, and part of the old sheathing was bolted. The work was done by day labour at a cost of \$2,982.23. During the fiscal year 1899 the cribwork forming the angle of the pier, near the shore end, was renewed in a substantial manner on a length of 180 feet, 12 feet wide and 19 feet high, the renewal of the top planking, which was commenced the previous year, was continued and a further length of 340 feet was done, the slip on the north-eastern side, which was considerably damaged by a storm of October 15, 1898, was repaired, four snubbing posts were renewed. The work was done by day labour at a cost of \$3,698.47.

During the last fiscal year the renewal of the top part of the pier, commenced two years ago, has been completed, 350 ft. of top planking have been renewed as well as the stringers; the L part, which had settled down two feet, has been levelled on its total length of 140 feet, 50 feet wide; the inner slip on the eastern side has been filled in with cribwork and stone ballast for a length of 50 feet, 10 feet wide and 18 feet high, a hand rail was built at the inner slip on a length of 440 feet, the western outer corner was sheathed with 10 inch birch timber and the western side for a length of 40 feet was sheathed with 5-inch timber. The buildings at the end of the pier were painted with two coats, outside and inside, other trifling repairs were also effected and the pier was placed in first class condition. The work was done by day labour at a cost of \$3,241.84.

The total amount expended on this work has been \$237,244.59, as follows :

Construction before Confederation.....	\$170,129.33
"    since    "    .....	28,069.13
Repairs .....	39,046.11

This work was transferred to control of Department of Marine & Fisheries on 16th September, 1891.

#### RIVIERE NOIRE.

Rivière Noire is a small village on the north shore of the St. Lawrence in the county of Charlevoix, 108 miles east of Quebec.

During the month of October the small breakwater commenced in 1893 was completed by raising it an additional height of  $2\frac{1}{2}$  feet with round cedar timber and stone ballast; it was also covered with 3-inch planks on its total length of 135 feet and a small approach of stone was built.

The work was done by day labour at a cost of \$300.35.

Spring tides rises 20 feet, neap tides 12 feet 5 inches.

#### RIVIERE OUELLE.

The pier is situated at Pointe aux Orignaux, four and one half miles from the village. It is substantially built throughout of cribwork filled with stone ballast, and is 1,350 feet long, of a uniform width of 28 feet apart of its outer 51 feet which is  $237\frac{1}{2}$  feet wide. Its head is 42 feet above the bottom of the river and stands in 10 feet of water at low water spring tides. The pier was completed in 1858, at a cost of \$225,299.87. In 1875 a lighthouse was erected on the head of the pier by the Department of Marine & Fisheries.

*Improvements and repairs.*—The gravel roadway which constitutes the top of the pier, having been frequently washed out by the seas which broke over it, was entirely covered in 1879 with a 3-inch plank flooring, the cost of which, together with that of minor repairs effected to the work since its completion, amounted to \$12,271.25.

In 1881 it was deemed advisable to raise the top of the structure which had settled over its whole length, to its original level, and the work was commenced. It was continued during the three following years and completed in 1885 at a cost of \$14,791.38. Owing to the decayed condition of some of the timbers, it became necessary to sheathe the head of the pier, a portion of the work was done in 1886 and it was completed in 1887, at a cost of \$7,109.71. During the winter of 1887 the pier was considerably damaged by the ice, the necessary repairs were effected in 1888 at a cost of \$935.00, and in the following years, a further sum of \$827.62 was expended on the landing slips, etc. In 1891, the two outer corners of the head of the pier were re-sheathed and missing sheet piles were replaced where most urgently required; the amount expended was \$1,494.28. From 1893 to 1897 inclusive, general repairs, amounting to \$1,820.97 were effected to the slips, flooring, cap pieces and sheathing. In 1899 the sheathing of the two outer corners of the pier was again renewed with birch timber and strengthened with iron straps; 100 feet of decayed or broken sheathing on both sides of the pier were removed and replaced by 5-inch spruce timber, missing iron straps on the steps of the slips were replaced, and other minor repairs were effected at a cost of \$1,004.85.

During the last fiscal year three pieces of face timber, which had been broken by ice on the western side of the pier, were replaced and that side sheathed with 6-inch timber on a length of 20 feet, and 21 feet high, 9 pieces of elm were put on eastern corner, the top of the platform of the eastern slip, which had been carried by ice, was renewed on a length of 50 feet including one tier of face timber, cross ties, stringers and 5-inc planking; 135 planks were renewed in the top floor and other trifling repairs were effected at a cost of \$792.15, the work was done by day labour.

The total amount expended at this place is \$269,845.49, viz :—

Construction before Confederation .....	\$225,229.87
Repairs and improvements .....	34,615.22
	<hr/>
	\$260,845.49

This work was transferred to control of Department of Marine and Fisheries on 28th September, 1892.

#### RIVER ST. MAURICE.

##### *Channel between Grandes Piles and Latuque.*

The St. Maurice River flows southwards and empties into the St. Lawrence at Three Rivers.

The river between the Outlet and Grandes Piles, a distance of 37 miles, is only navigable for short distances between the falls and cascades which are in great number. The section between Grandes Piles and Latuque, a distance of 65 miles, is navigable for vessels with a draught less than 4 feet, at low water.

There are however some impediments in the channel which render navigation difficult and in some places dangerous, specially at the Rapids Manigonce.

1899-1900.

The "dredge St. Maurice" commenced dredging on September 12th 1899 and continued working until November 7th, when she was towed down and put in winter quarters at Pt. à Magdeleine.

In April and May, slight repairs were done to the dredge "St. Maurice" and more accommodations were given to the crew.

On June 26th, the dredge was towed up in order to resume work at the shallowest places of the channel, which was at Mékinac shoal. On July 12th, a cut 40 feet wide was opened to the shoal.

On July 13th, the dredge was removed to the next shallowest place which was to a bar at l'Isle aux Morpions.

On the 3rd October, the cut 40 of feet wide was completed at the crossing at l'Isle aux Morpions. The dredge was then removed to Pointe à Trudel shoal, near Grandes Piles, but had to do some dredging at the crossing at La Pêche, in order to make her way down.

The dredge could only reach the Pointe à Trudel shoal on the 25th October owing to her having to cut through small shoals to make her way down. The work was discontinued on the 15th of November. The river was covered with ice. The dredge was then towed down and put in winter quarters at Pointe à Magdeleine.

Buoys have been kept at the shallow points during the navigable season to indicate the channel. Land marks were established on the river bank to indicate the channel.

Total expenditure incurred in 1899-1900, \$4,359.11.

##### *Eastern Channel.*

On the 16th October, 1899, at the outlet of the eastern channel of the St. Maurice River to remove the shoal obstructing the entrance of the said channel. The work was discontinued on November 16th-

Total expenditure to 30th June 1899-1900, \$2,025.00.

#### ROBERVAL.

*Roberval.*—This village, in Chicoutimi county, is built on the east bank of River Ouïatchouanish, near its mouth on the southern shore of Lake St. John,

200 miles north-east of Quebec city, and is the northern terminus of the Roberval branch of the Quebec and Lake St. John railway, which taps the main line at Metabetchouan station. Population 1100.

This place contains three churches, three hotels, four saw mills, two grist mills, four cheese factories, telegraph and express offices and some 14 stores. It is a favourite resort for sportsmen, and tourists generally, in the summer season, when five steamers leave the Government wharf daily, carrying freight and passengers to and from important settlements, as well as on pleasure excursions undertaken for the special benefit of the large number of people who visit the Lake St. John region every day.

In 1892-3, the department purchased from H. G. Beemer, Esq., for the sum of \$750.00, an isolated block of cribwork, 75 feet long by 30 feet, which had been built by him at the mouth of the river, 425 feet from the shore of Lake St. John, together with the right of way to the public road, with a view of utilizing the block, etc., in connection with the then projected public landing piers. During the years 1892-93 and 93-94 this block was connected with the shore by means of an approach 425 feet by 25 feet, built of six blocks, 20 feet by 25 feet, of ballasted close-faced cribwork, an earth embankment 50 feet long and six intervening timber spans, at a cost of \$5,469.06. In 1894-5, a head block parallel with the shore, 50 feet by 30 feet and 24 feet high, with slip at outer end was added and the entrance channel of the Oniatouchuanish was deepened and widened; 2,750 cubic yards of earth and about 60 boulders removed. Total cost of work carried out \$4,200.31.

This pier as completed in 1895, was 500 feet long and 25 feet wide generally, with the exception of the head block, which measures 50 feet by 30 feet, and has 8 feet of water along its outer face, at low water and 19 feet at high water during the season of navigation; in the winter the lake recedes beyond the head of the pier which is completely dry all around. During the year 1896-7, a combined freight and shelter shed, 45 feet by 24 feet, was erected on the head block at an expense of \$425.98. In 1897-8, a block of cribwork 75 feet by 25 feet was sunk close to the crib purchased from Mr. Beemer, for the purpose of widening that part of the wharf to 50 feet. Amount expended \$713.86.

The total amount expended on this wharf for construction is \$11 559.21.

#### SABREVOIS.

The Parish of Ste. Anne de Sabrevois, in the county of Iberville, is situated on the east shore of the river Richelieu, 7 miles from Iberville and 6 miles from St. Alexandre on the C.P.R. It is a station of the "East Richelieu Valley Railway." It has the largest creamery of the Province of Quebec, two cheese factories, one hotel, three stores, one door and sash factory, one post and telegraph office two churches, one Roman Catholic and one Protestant.

In order to better accommodate the traffic by water way to and from this place, an old wharf together with a right of way from the public road to the river, a distance of 1372 feet by a width of 30 feet, was purchased from Mr. Wm. Ryan, for the sum of \$500.00. As the old wharf was entirely dilapidated a new wharf was built at its place.

The new structure consists of the following, viz:—

- a. A stone embankment 200 feet long, by 20 feet wide with slopes 1 in 1.
- b. A trestle approach 120 feet long 24 feet wide.
- c. A head block of pile work 108 feet long, parallel to the channel, by a depth of 30 feet, with an ice-breaker, at its up stream end, of solid cribwork.

The work commenced in February last was done by labour day and was not completed at the end of the fiscal year.

The amount expended was \$4,482.94.

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## SAULT AU COCHON.

Sault au Cochon is situated in the County of Saguenay on the north shore of the St. Lawrence.

In 1885 an isolated block was built 100 feet in length by 30 feet in width just beyond low water mark.

Total expenditure to 30th June, 1900—\$4,494.41.

## STE. ADELAIDE DE PABOS.

Ste. Adelaide de Pabos, commonly called Little Pabos is an important parish in the County of Gaspé.

In 1888 a strongly built breakwater was constructed 200 feet in length to afford shelter to the fishing boats of this locality.

Total expenditure to 30th June, 1900—\$12,008.63.

## ST. ALEXIS.

St. Alexis is on the south side of Ha Ha Bay, River Saguenay, about 63 miles from its mouth.

In order to accommodate the increasing traffic of the locality and afford landing facilities at this place for steamers frequenting the River Saguenay, the sum of \$4,000 was appropriated at the session of parliament of 1898 for the construction of an isolated pier at a short distance from the shore. The pier is 60 feet long, 30 feet wide and 39 feet high, the outer end being in 13 feet of water at low water spring tides; the outer end is at a distance of 700 feet from the shore.

The pier is built of square timber, filled with stone ballast and sheathed with 5-inch tamarack timber.

During the past fiscal year two blocks 75 feet in length by 25 feet in width and 25 feet apart were built and filled with stone then connected by spans. The outer block was sheathed with 5 inch tamarac at a cost of \$3,999.00.

Total expenditure to 30th June, 1900 is \$7,999.90.

## ST. ALPHONSE.

St. Alphonse is at the head of Ha Ha Bay, River Saguenay, about 66 miles above its mouth.

During the fiscal year 1899, the planking and stringers were completed on a length of 275 feet, and the north-east side of the pier was sheathed with 5-inch tamarack over a length of 275 feet. The work was done by day labour, at a cost of \$2,000.57.

A landing pier was built at this place, prior to Confederation, by the municipal authorities at an expense of about \$3,200. In 1896 an addition was built by the department on the north side of the original pier, 55 feet long by 26 feet wide. In 1881-82, a length of 378 feet of the original pier, which had been burned down to low water level at the shore end in April and May 1870, was rebuilt for an average height of 10 feet, a large portion of the flooring renewed and other repairs made with a view of lengthening the pier. A head block was added in 1883-84, measuring 50 feet in width by 40 feet in length by 57 feet in height, and having the top about 9 feet above high water, ordinary springs, and a movable slip at outer end; moreover, the pier itself was raised 3 feet over its whole length of 460 feet. In 1886-87 a freight shed, 50 feet by 30 feet, and a waiting room, 24 feet by 18 feet, were erected, and from 1888 to 1895, the flooring was renewed throughout and other repairs made from time to time.

During the fiscal year ended 30th June 1897, a shed 30 feet by 45 feet was erected on the eastern side of the pier, for keeping under cover the large quantities of butter and cheese which are brought every year to this wharf for exportation; the face timbers on the slipway were also renewed. The expenditure incurred in 1896-97 amounts to \$487.78.

It will be seen from the above that this pier as completed consists of an approach of solid ballasted cribwork 460 feet long by 26 feet wide and a head block 50 feet wide by 40 feet long. Depth of water available along outer face at low water, ordinary spring tides, about 29 feet. Ordinary spring tides rise 18 to 19 feet; neaps, 11 feet.

During the past fiscal year the north and south sides of pier for a distance of 250 feet was sheathed with 5-inch tamarack and the planking was renewed over the same length and 25 feet in width at a cost of \$548.

Total expenditure to 30th June 1900 is \$31,913.28.

#### ST. ANICET.

St. Anicet is a post village in Huntingdon county, 10½ miles from White Station on the Grand Trunk Railway (Montreal and Champlain division), and 56 miles south-west of Montreal, on the south shore of Lake St. Francis. It contains one Roman Catholic church, three stores, two hotels and one telegraph office. Population 250. This pier was built in 1862, at a cost of \$1,920, and stands 5 feet 3 inches above low water. It is 300 feet in length, the width of the 200 ft., nearest to the shore, or approach is 13 feet, and the other 100 ft., or outer block, 35 feet. The shore abutment consists of a solid crib 47 feet long and the remaining 153 feet of the approach is supported on four cribs, 12 by 13 feet long, united by timber spans of stringers and planking. In 1889-90 some slight repairs were made, amounting to \$48.67. In 1890-1 the entire approach, 200 feet long, was rebuilt from the water line, at a cost of \$635.10. In 1892-3 small repairs were made, amounting to \$25.88. In 1893-4 the outer block 100 feet by 35, which is of solid cribwork, was rebuilt from the low water line, by Mr. L. N. Masson, contractor, at a cost of \$1,500. A shed, for the accommodation of passengers and freight, was also built on the wharf the same year, at a cost of \$225.35. In 1897-8 the sum of \$2,197.95 was expended for the addition of a wing or return 60 feet long by 30 feet wide at the outer end and 40 feet wide at the inner end, on the upstream side of the wharf, the object being to enable vessels to lie at the front of the wharf instead of along its sides, where it is very difficult to land during rough weather caused by westerly winds. This addition was built of close-faced cribwork, but was not completed at the end of the fiscal year.

During the fiscal year 1898-9 the sum of \$1,423.75 was expended to complete the construction of the above mentioned addition and to make general repairs to the old wharf. The work was done by day labour.

The total amount expended on this work is \$7,976.70 as follows:—

The construction.....	\$5,541 70
Reconstruction.....	2,360 45
Repairs .....	74 55
Total.....	\$7,976 70

#### STE. ANNE DE BELLEVUE.

The town of Ste. Anne de Bellevue, in the county of Jacques-Cartier, is situated at the confluence of the Rivers Ottawa and St. Lawrence, 21 miles west of Montreal. It has Roman Catholic and Protestant churches, a com-



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mercial college, a convent and a Protestant school, 4 hotels, 8 general stores, &c. Population 1800. It is a favourite summer resort.

At the session of 1884 the sum of \$4,750 was voted for the purpose of building a wharf at this place, and on 9th May 1885 a contract was entered into with Messrs. Gohier & Dagenais for its construction for the sum of \$4,150. On 28th May 1885, the dredge "Nipissing" commenced excavation for the foundation of the wharf and worked until 17th June, removing 1,457 cubic yards of hard pan and boulders. Expenditure for the dredging, \$480.16, and on wharf, \$298.90.

With the unexpended balance of appropriation carried forward from 1884-85, the wharf was completed in October 1885. In May 1886, it was found necessary to make a roadway from St. Peter Street to the wharf to give free access thereto, and the land taken was fenced in. Expenditure during the fiscal year was \$5,404.22.

During the fiscal year 1886-87 some necessary alterations were made to the pier recently built by the department. Expenditure, \$736.29. The dredge "Queen" worked here from 29th October to 10th November 1886, to get a depth of 9 feet at the pier, and removed 861 cubic yards of boulders, clay, gravel and stone, at a cost of \$554.26.

By the increase of population the wharf became inadequate for the requirement of traffic. During the session of 1899 the sum of \$2,500 was voted for an extension to the wharf, at the close of fiscal year, a strip of land 30 feet wide by 75 feet long alongside the inner face of the wharf was purchased at a cost of \$2,152. The extension to be completed during next fiscal year.

The total expenditure on this work is as follows:—

Construction, including purchase of right of way . . .	\$5,703 12
Dredging . . . . .	480 16
Alterations . . . . .	736 29
Dredging . . . . .	554 26
Extension, purchase of land . . . . .	2,152 00
Total . . . . .	\$9,625 83

## STE. ANNE DE LA PARADE.

Ste. Anne de la Parade, in the county of Champlain, is situated on the north shore of the river St. Lawrence, fifty-three miles above Quebec. The Rivière Ste. Anne, one of the tributaries of the St. Lawrence divides the village.

At the session of 1894, a sum of \$10,000.00 was voted for the protection of the village, the municipality having subscribed the sum of \$5,000.

The proposed works were done during the winter of 1895, and consisted of five dykes.

The dykes are No. 1, 140; No. 2, 170; No. 3, 340 and No. 4, 435 feet in length respectively, the fifth, near the C. P. R. bridge is 340 feet in length, and that of the little channel on the west side of the river is 550 feet in length.

These dykes consist of two rows of piles driven 10 feet apart and filled with brush loaded down with stone.

It is to be remarked that the soil, where piles have been driven, is a fine sand taken down by the river from the landslide at St. Albans, the bed of the river having been raised 6 feet at Ste. Anne.

A sum of \$14,906.05 was expended during the year of 1895.

During the fall of 1895, work have been executed for the removal of a certain portion of trees, stumps, etc., accumulated in the Little Channel owing to the land slide at St. Albans.

During the winter of 1896, dyke No. 1 was reconstructed for a length of 220

feet and No. 5 was repaired. These dykes experienced considerable damage by the breaking of the ice in December, 1895.

The amount expended during the fall of 1895 and winter of 1896, was \$4,373.90.

Total expenditure to 30th June, 1900, including dredging, \$65,577.14.

#### STE. ANNE DE LA POCATIÈRE.

The village of St. Anne de la Pocatière, in the county of Kamouraska, is situated on the south shore of the St. Lawrence, 75 miles below Quebec. Spring tides rise 20 feet. Neap tides, 13 feet.

*Construction.*—In order to accommodate the extensive shipping trade of the village and locality, the construction of a landing pier was commenced in 1885 and completed in 1887 at a cost of \$9,893.15. It is 580 feet long over and 20 feet wide, and consists of a stone and earth embankment or approach 100 ft. long and 20 feet wide with side and end slopes of 1 in 1, and of 11 cribs placed 25 feet apart and connected with platforms. The cribs are all 20 feet square, apart from the outer one which is 30 feet square. The head of the pier is 23 feet high and stands in 16 feet of water at high water spring tides; it is dry at low water.

*Repairs.*—During the year 1898 the pier was repaired for the first time since its completion in 1887. One of the cribs which was moved out of place by the ice was unloaded and floated in its proper position, part of the floor stringers and flooring was renewed, about 50 toises of stone were placed in the cribs not sufficiently ballasted, the outer corners of the head of the pier were sheathed and the approach repaired.

The work was done by day labour at a cost of \$984.17.

The total expenditure on the work is \$10,877.32, as follows:—

Construction .....	\$9,893 15
Repairs .....	984 17
Total .....	\$10,877 32

#### STE. ANNE DES MONTS.

Ste. Anne des Monts, Gaspé County, is on the south shore of the St. Lawrence, 108 miles east of Rimouski.

In November, 1890, a contract was entered into for the construction of an isolated block of cribwork, 100 ft. in length by 46 ft. in width, measured on top.

On the 30th June, 1892, the work was practically completed, an estimate amounting to \$9,225.20 on a contract of \$9,294.00 having been given in favour of the contractor, and the whole was completed and a final estimate rendered in October, 1892.

Total expenditure to 30th June, 1900 \$11,570.10.

#### STE. ANNE DE SOREL.

The village of Ste. Anne de Sorel, in the county of Richelieu, is situated at the head of Lake St. Peter, on the south shore of the St. Lawrence, two miles below the town of Sorel. During the spring freshets of the St. Lawrence a considerable portion of the parish of Ste. Anne and of the islands opposite, is flooded. In order to prevent the ice from being carried by the floods over the low-lying lands along the shore, ten ice piers were built between 1881 and 1890 at or in the vicinity of the village.

*Construction.*—The two first piers were built in 1881-82 in the Chenal du Moine, one of the channels of the St. Lawrence, and about two miles below the

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village of Ste. Anne. They were 30 feet square and fully answered the purpose for which they were intended. Their total cost was \$1,957.97. At the end of the year 1882-83 the construction of two additional piers was commenced in the same channel. They were completed during the winter of 1883-84 at a cost of \$3,536.38. Another pier was built in 1885 at the head of Chenal du Moine, at a cost of \$1,176.53, and repairs amounting to \$7.20 were effected to the piers built in 1884. The sixth pier was built in 1886 at a cost of \$1,321.86, which amount also included the cost of repairs effected to the piers built in 1884. In order to afford further protection against ice shoves a seventh pier was built in 1887, a short distance below the one built in 1885. Its cost was \$836.66. The eighth pier was built in 1888 on the property of Bruno Peloquin, and one of the piers built in 1884 was raised 3 feet 4 inches at a cost of \$947.67. In 1889, another pier was built at the entrance of Chenal du Moine, about 11½ miles below the village. It was 30 feet long, 24 feet wide and 21½ feet high and cost \$2,708.28. In 1890, the necessary materials for the construction of another pier, opposite the church, were procured at a cost of \$2,497.11, and in 1891 the structure was carried up to a height of five feet above low water level at a cost of \$1,696.25. The pier measures 60 feet by 25 feet at the bottom, of 56 feet by 24 feet on the top. It stands in seven feet of water and has a height of 12 feet. During the year 1899 three new piers were built for the protection of properties which were not guarded by the old ones, and one of the latter was strengthened and repaired. The new piers measure 24 feet by 20 feet and are from 12 to 14 feet in height. Their total cost amounted to \$3,514.68.

Before the construction of the above described works the properties along this lowlying shore were considerably damaged every year at the breaking up of the ice. The protection afforded by the ice piers has, however, been so effective that little or no damages are now sustained, and it is expected that no additional works of this nature will be required.

The total expenditure on ice piers at Ste. Anne and along the Chenal du Moine is \$16,685.91, which amount includes cost of repairs to the old works as well as that of construction of the new ones.

## STE. ANNE DU SAGUENAY.

The parish of Ste. Anne du Saguenay is situated on the north shore of the Saguenay River, 72½ miles above Tadousac, and opposite the town of Chicoutimi. Its population in 1897 was over 2,000. Besides the church and post office, the parish contains seven stores, four cheese factories, a lime-kiln, a brickyard and a pottery. The only market for the produce of the farms of this section of the north shore of the river is Chicoutimi. Spring tides rise 15 feet; neap tides 8 feet.

*Construction.*—As early as 1879 the Dominion Government was urged to construct a landing pier for the accommodation of the inhabitants of the district. The request was not, however, considered until 1888, when a portion of the timber required for the proposed structure was purchased at a cost of \$2,100. In 1889 the pier was commenced from shore outward, and at the close of the year 1888-9, a portion 77 feet long and 39 feet wide, including a slip 12 feet wide on its lower or eastern face, had been completed at a cost of \$2,109.69. It was built of close-faced cribwork, filled with stone ballast. In 1890 this shore block was extended 87 feet on a width of 27 feet, at a cost of \$2,045.50, and in 1891 a further length of 50 feet of similar cribwork, 27 feet wide, was added, at a cost \$2,498.06. In 1892 a head block 30 feet long, 60 feet wide and 20 feet high was built at a distance of 250 feet out from the end of the work completed the previous year, at a cost of \$2,262.11, and in 1896 this block was raised 8½ feet and put on the same level as that of the work built out from shore, viz., 6 feet above ordinary

high water spring tides. With a view of completing the pier to shore, a sum of \$5,573.25 was expended in 1897 for the construction of two cribs, each 87½ ft. long and 25 ft. wide, placed 25 feet apart and 25 feet from both the head and shore blocks. During the year 1898 the three 25 foot openings left in the work were spanned, the flooring was laid and the structure completed to shore, at a cost of \$746.70. The pier is now 494 long, 39 feet wide for the first 95 feet from shore, 27 feet wide for the following 119 feet, 25 feet wide for the next 250 feet, and finally 60 feet wide for the last 30 feet. It is 28½ feet high above the bottom of the river, at its outer end, and stands in 7½ feet of water at low water spring tides. It is substantially built throughout of close-faced cribwork filled with stone ballast. Some boulders were removed in 1894 from the vicinity of the head of the pier at a cost of \$99.30. During the whole season of navigation a steamboat performs a regular ferry service every hour from Ste. Anne to Chicoutimi.

During the fiscal year 1899 the planking of the part of the pier constructed in 1888 was renewed over a length of 250 feet, the sides of the cribs built in 1897 were sheathed on a length of 200 feet and fenders were placed at the angles.

The work was done by day labour, at a cost of \$1,099.81.

During the past fiscal year the outer block for 110 feet was sheathed with tamarack, about 300 feet of the plauking was renewed with 3-inch tamarack at a cost of \$1,499.99.

Total expenditure to 30th June, 1900 is \$21,034.17.

#### STE. FAMILLE.

The village of Ste. Famille is situate on the north shore of the Island of Orleans, in the county of Montmorency, 17 miles below Quebec. Spring tides rise 19 feet. Neap tides, 13 feet.

*Construction.*—In 1876 the inhabitants constructed a small landing pier, which was considerably extended and enlarged by the department between the years 1879 and 1882 at a cost of \$9,323.86. It is now 475 feet long and consists of a head block 231 feet long and 25 feet wide, apart from a slip eight feet wide along its lower or eastern face, and of five cribs, connected with stringers, upon which the flooring is laid. The four cribs adjoining the head block are 25 feet square and are placed at distances varying from 24 feet to two feet apart. The shore end crib is 58 feet long and 18 feet wide. The head of the pier is 24 feet high above the bottom of the river and stands in 18 feet of water at high water spring tides.

*Repairs.*—In 1887 the pier was thoroughly repaired at a cost of \$300.04. In 1891 the flooring of the pier was renewed and additional floor stringers were put in. One of the cribs was also rebuilt and new fenders placed on the outer end of the structure; expenditure, \$999.30. During the year 1898 the two outer spans between the isolated cribs were filled with cribwork and stone ballast, the stringers and flooring were renewed on the whole length of the pier, and the snubbing posts and fenders were renewed. The work was done by day labour during the months of July and August, at a cost of \$1,809.82.

The total expenditure on this work is \$12,433.02, made up as follows:—

Construction.....	\$9,323.86
Repairs.....	3,109.16
Total.....	<u>\$12,433.02</u>

#### ST. FELICIEN.

*St. Felicien.*—A post village in Chicoutimi county, on the Assametquagan River, 15 miles from Roberval, on the Quebec and Lake St. John Railway. It

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contains one Catholic church, five stores, one hotel, and four saw and grist mills. Population 1,000.

During the year 1895-6 a wharf was built to accommodate the local trade. It is 70 feet in length, 26 feet in width and 22 feet high at the outer end, at which vessels drawing 8 feet can lie at low water. A shed 20 feet square was erected on the wharf at its inner end.

During the fiscal year 1899 an addition 90 feet long, parallel with the channel, and 40 feet wide was constructed at right angles to the wharf at its outer end.

During the past fiscal year the wharf was resheathed 30 feet in length and 10 feet in height, which had been damaged by ice, at a cost of \$100.00.

Total expenditure to 30th June, 1900, is \$3,208.87.

## ST. FRANÇOIS, ISLAND OF ORLEANS.

The parish of St. François is near to that of St. Jean, and comprises the eastern extremity of the island and around the south and north to Ste. Famille.

The whole of the superstructure on an average height of 5½ feet from the outer end and 300 feet in length was rebuilt, this portion having been broken by the ice.

The slip at the outer end was raised and levelled with new flooring. Six new posts were added and 680 feet of capping replaced.

All the old elm fenders were taken off and the best portions replaced in one or two lengths, with the addition of 900 new fenders. The west side of the wharf on a length of 240 feet and the full height of the wharf was sheathed with 3-inch black spruce, and 70 feet of the east side was similarly protected, and the outer corner angles protected with 4-inch elm 20 feet long.

The small shed at the shore end was repaired and re-shingled.

Expenditure during the year, \$1,705.62.

Total expenditure to 30th June, 1900, \$15,298.73.

## ST. FULGENCE.

St. Fulgence (otherwise called l'Anse aux Foins) is a small village in Chicoutimi county, on the north shore of the Saguenay River, 10 miles from Chicoutimi. It contains one Roman Catholic church, four stores and two saw-mills. Population of Parish 1,000.

In 1897-8 the department commenced the construction of an isolated block of close-faced cribwork to enable schooners and steamers of the Richelieu and Ontario Navigation Co. to land and ship freight and passengers at all times. This block is 60 feet long and 30 feet wide, and was built during the year to an elevation of 20 feet from the bed of the river. The block is sunk in 10 feet of water at low water spring tides at a distance of about 2,500 feet out from the shore at high water mark. Spring tides rise 20 feet; neaps 13 feet. The amount expended on this work during the year was \$5,998.04.

During the fiscal year 1899 the pier was raised 5 feet and the sides sheathed over a length of 90 feet, and 15 toises of stone ballast were placed in the pier. The amount expended was \$1,498.38.

In the winter of 1899 the isolated block was damaged by ice and to prevent a recurrence, a talus of stone 30 feet long by 17 feet high was built; the block was raised 3 feet and the south side was resheathed with 5-inch tamarac at a cost of \$1,499.00.

Total expenditure to 30th June, 1900, is \$5,995.42.

## ST. GÉDÉON.

St. Gédéon Parish is situated on the south shore of Lake St. John 33 miles west of Roberval.

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This wharf constructed on the bank of the River Konchpigan, commonly called Belle Rivière, consists of a block 60 feet in length, 30 in width and 22 in height, built principally of white pine, which is connected with the shore by pile work 70 feet in length, the whole length is planked over, the approach built of stone, gravel, etc., a shed 20 x 25 feet erected for freight shed and waiting room at a cost of \$2,998.00.

## STE. GENEVIÈVE.

Ste. Geneviève is situated in Jacques-Cartier county, on the south shore of the Rivière des Prairies, 5 miles from Pointe Claire. Population about 700.

In 1890-1 a pier was constructed, consisting of four cribs with ice breakers, 20 by 30 feet at low water line and 20 feet square on top, placed 20 feet apart and the roadway covered with 3 inch plank. The approach is 76 feet in length, making the total length of the pier 239 feet.

Repairs were made in 1898-99, 4 piers were raised 1 to 3 feet, the ice breaker sheathing was renewed, &c., at a cost of \$1,036.16.

During the last fiscal year the repairs were completed at a cost of \$202.96.

The total amount expended on this work is as follows, viz :—

Construction .....	\$9,433 58
Repairs .....	1,239 12
Total .....	\$10,672 70

## STE. IRÉNÉE.

The village of Ste. Irénée is situated on the north shore of the St. Lawrence, in the county of Charlevoix, 78 miles below Quebec and 5 miles west of Murray Bay. It contains 1 cheese factory, 2 grist-mills and 4 saw mills. Spring tides rise 19 feet. Neap tides, 12 feet.

*Construction.*—In September 1886, a contract was entered into for the removal of a block 80 feet long, 30 feet wide and 18 feet high, from Les Eboulements to this place, and during the year the work was done at a cost of \$3,284 87. The block was sunk in 12 feet of water at low water spring tides, at a distance of about 535 feet from high water mark. In 1888 and 1889 the block was raised 19 feet, thoroughly repaired and floored at a total cost of \$5,689.48. In 1896 a close-faced cribwork extension 60 feet long, 22 feet wide and of an average height of 30 feet, was built shoreward on a line with the east side of the block, at a cost of \$2,128.68. A portion of this extension was carried away by an ice shove in January 1896, it was rebuilt in May and June 1897, and made 62 feet long, 32 feet wide and 33 feet high, at a cost of \$3,588.31, which amount also included the cost of necessary repairs to the block. During the year 1898 a further close-faced cribwork extension 177 feet long, 20 feet wide and of an average height of 23 feet, was built shoreward at a cost of \$4,000 94. The pier is now being completed to shore.

*Repairs.*—Sundry repairs were effected to the block in 1894 and 1895 when the sums of \$79.99 and \$21.50 respectively were expended. In 1896, a sum of \$781.20 was expended for general repairs.

*Improvements to the mouth of the river.*—The pier is built about one third of a mile to the westward of a small river. In 1890, a sum of \$501.73 was expended in removing boulders from the mouth of the river so as to allow schooners to winter safely therein. With the boulders removed a small breakwater was built to further protect the entrance to this small harbour from north-east winds.

During the last fiscal year this pier was completed, three tiers of face timber, on a length of 200 feet, left unfinished last year, were added to the structure as

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well as the unfinished part of the top planking; an open shed, 24 x 50 feet was built at the outer end and painted two coats; a movable slip, raised and lowered by means of winches and chains, was built at the outer end and a quantity of boulders and brush work were piled on the eastern side, inner end, where the waves had somewhat undermined that part.

The work was done by day labour at a cost of \$1,200.75.

The boulders which obstructed the approach on the western side were removed.

The wharf is now 655 feet long with an outer mooring face of 80 feet, there is a depth of 12 feet at low water spring tides at the end.

Total amount expended at St. Irénée is \$26,302.01, viz:—

Construction.....	\$24,917 59
Repairs.....	882 69
Improving mouth of river.....	501 73

\* Total..... \$26,302 01

This work was transferred to control of Department of Marine & Fisheries on 29th May, 1891.

## ST. JEAN (ILE D'ORLEANS)

The village of St. Jean is situate on the south shore of the Island of Orleans in the county of Montmorency, 18 miles below Quebec. Spring tides rise 19 feet. Neap tides, 13 feet.

*Construction.*—The landing pier at this place was built by the municipality in or about 1859. It is 651 feet long over all, and consists of a stone and earth embankment or approach 101 feet long and 30 feet wide at the top, and of a close-faced cribwork structure 550 feet long, and of a uniform width of 30 feet, apart from its outer 83 feet which is 50 feet wide. The head of the pier is 32 feet high above the bottom of the river, and stands in eight feet of water at low water spring tides. A lighthouse was erected in 1874 on the head of the pier, by the Department of Marine and Fisheries. In 1884, the first steps were taken by the department towards the purchase of the structure and a sum of \$60.55 was expended for surveys and legal expenses. The purchase was effected in 1885 at a cost of \$8,183.46, including legal and other expenses.

*Repairs.*—The pier was repaired by the department in 1881 at a cost of \$470.93, and in 1884 a further amount of \$55.70 was expended on minor repairs. In 1886 repairs were made to the roadway and to the slip on the east side of the wharf at a cost of \$699.98 and during the following year general repairs were effected at a cost of \$1,009.20. In 1891, a sum of \$500.82 was expended on repairs to the flooring and to the approach, and in 1893, a number of broken planks in the flooring were renewed at a cost of \$25.00. In 1894, it became necessary to rebuild the superstructure of the pier, the timbers of which were in an advanced state of decay. The work was continued in 1895 and completed in 1896 at a cost of \$8,658.32. The whole superstructure of the work for a depth of 5 feet 9 inches was removed and rebuilt with new face timbers, cross ties, longitudinal, floor stringers, flooring and mooring posts. The slips were thoroughly repaired, the east side of the structure was sheathed on the whole length with rock elm and black birch, the foundations of the lighthouse were rebuilt, and the lighthouse itself was thoroughly repaired and strengthened. In 1897 a combined waiting room and freight shed 40 feet long and 14 feet wide was erected on the head of the pier at a cost of \$389.38. During the year 1898 the freight shed was moved on the extreme outer end of the pier, enlarged and painted; the face timbers under the slip, which had been broken by ice, were renewed on a height of six feet and part of the slip was covered with 3-inch planks; the west side of the pier, at its inner end, was sheathed for a length of 150 feet and the stone and earth approach repaired. The work was done by day labour at a cost of \$480.11.

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During the last fiscal year slight repairs were executed on the wharf, two oak fenders were placed at the outer corners and 18 broken fenders on the western side were renewed as well as 200 planks in the top flooring, the work was done by day labour in the month of October at a cost of \$255.14.

The total amount expended on this work is \$20,788.59 as follows:—

Purchase .....	\$8,224.01
Reconstruction, including freight shed.....	9,047.70
Repairs.....	3,496.88
	<hr/>
	\$20,788.59

This wharf was transferred to control of Department of Marine and Fisheries on 9th March, 1883.

#### ST. JEAN PORT JOLI.

St. Jean Port Joli is in the county of L'Islet, on the south shore of the St. Lawrence, 55 miles east of Quebec.

The public wharf at this place has a total length of 470 feet, inclusive of shore abutment 40 feet long. It is 18 feet wide on the top for a distance of 277 feet from the abutment outward; thence it widens out for 60 feet up to 35 feet, and retains this width up to the outer end. The structure consists of five blocks of open faced cribwork of various sizes and an abutment, all connected by timber spans; the top of the wharf stands four feet over high water mark of ordinary spring tides, except at the outer block, where it is half a foot lower.

The depth available at the outer end of the wharf at low water ordinary spring tides is about four feet. During the month of June, 1897, the sheathing on the two outer corners was renewed with six inch birch; also, in part, the top planking. Moreover, the two inner blocks which had been somewhat damaged were sheathed with three inch spruce planks and 300 lineal feet of new cap pieces were put on the wharf. Work all done by day labour at a total expense of \$474.56.

Total expenditure to 30th June, 1900—\$13,912.09.

This wharf was transferred to control of Department of Marine & Fisheries on 25th August, 1896.

#### ST. JÉRÔME.

St. Jérôme is a village situated on the south bank of Lake St. John, 24 miles east of Roberval.

The wharf commenced in March last consists of an approach 75 feet in length, 25 in width and 15 in height filled with stone ballast, sand &c; two outer blocks 75 feet in length by 20 feet in width with 25 foot spans between, which are connected by stringers and planking. The whole length of 275 was planked, 6 snubbing posts were placed, etc at a cost of \$4,999.28.

#### ST. LAURENT.

St. Laurent, in the county of Montmorency, is situated on the south shore of the Island of Orleans, 10 miles east of Quebec; the place is somewhat frequented as a summer resort. Spring tides rise 20 feet, neap tides 13 feet.

*Construction.*—An isolated block, 104 feet long and 32 feet wide, on which a lighthouse was to be erected, was commenced here in 1866, the outer end of the pier was placed in 7 ft. of water at low water spring tides; in that year, the sum of \$8,416.58 was expended on the structure; the pier and lighthouse were completed in 1868 with a further expenditure of \$7,208.96. It being found that the pier was too light to resist the pressure of the ice, it was decided to continue it to



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the shore. With that end in view, in 1869 and 1870 the sums of \$7,492 and \$1,326.25 respectively were expended in each year. The total amount expended between 1867 and 1882, including repairs, was \$17,245.83. The pier was then 600 feet long and 20 feet wide, with the exception of the outer 104 feet, which was 32 feet wide, and there was 7 feet of water at the end at low water spring tides. In 1888 the approach road was built and the slip completed, at a cost of \$413.24. In order to obtain a depth of 9 feet at the end of the pier, a contract was given in 1890, for the construction of an extension outward, 60 feet long, 60 feet wide at the outer end and 50 feet wide at its junction with the old pier; the work was completed in 1891 at a cost of \$7,841.87. The pier is now 660 ft. long, 20 feet wide at the shore end, 32 feet wide on a length of 104 feet and 60 feet wide at the outer end, with 9 feet of water at low water spring tides.

*Repairs.*—In 1887 general repairs to the main body of the pier were effected, at a cost of \$1,304.67; in 1889 the roadway was repaired and partly renewed at a cost of \$369.28; in 1892 the sum of \$206.60 was expended in repairing the landing slip, broken during a storm in August 1891. In 1893, the pontoon under the slip having broken away, it was decided to raise and lower the landing slip by means of winches, chains and tackle, which were purchased and placed in position, and small repairs were done to the top planking, at a cost of \$250.65. In 1894, an open shed with a small freight shed and waiting room, were built at the head of the pier; the whole structure is 40 feet long, 25 feet wide, with a sheet iron roof; the cost was \$665.47. The top planking was partly renewed in 1895-6; the sums of \$56 and \$179.17, in each respective year was expended.

During the fiscal year 1899, the top part of the old pier, having been found in a dangerous state of decay, for a height of 6 feet, the work of renewing was commenced and the pier was rebuilt 2 feet higher than it was originally, with pine and cedar timber, on a length of 200 feet, at a cost of \$2,008.99. On October 15, 1898, during a heavy storm, the stringers of the moveable slip were broken, the repairs being urgent, the sum of \$144.82 was expended and the damage made good; the amount expended during the year, was \$2,153.81.

During the last fiscal year the renewal of the top part of the pier was continued, a further length of 540 feet being rebuilt: the bottom part, on the western side was strengthened by new face timbers on a length of 200 feet, 5 feet in height and 50 toises of stone ballast were put in the wharf. The work was done by day labour and the amount expended was \$4,064.98.

The total amount expended on this pier is \$43,168.15 as follows:—

Construction before Confederation.....	\$ 8,416 58
Extensions and improvements since Confederation including shed built in 1894.....	26,166 41
Repairs.....	8,585 16
Total.....	\$ 43,168 15

This pier was transferred to control of Department of Marine and Fisheries on 25th August, 1894.

## LANDING PIERS LOWER ST. LAWRENCE.

The department has, since 1894, undertaken to carry out works of improvement at various places along the south shore of the St. Lawrence below Matane, with a view of providing safe and easy landing places for the fishermen engaged in their arduous calling; the results have in many instances proved very encouraging.

During the fiscal year 1896 a sum of \$1,103.15 was paid out in improvising landings for fishing boats at the undermentioned places, viz.: Newport, Newport Point (Anse au Canard), Little River East, Anse à Beauvils, Percé, Anse à Gris-

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fond, Cape Rosiers, Fox River, Chlorydorme, Pointe Sèche (St. Yvon), Frigate Point, Grande Madeleine, Petite Madeleine, Cap Chatte, Ste. Anne des Monts, Grande Vallée des Monts and Ste. Adelaide de Pabos.

During the last fiscal year the following sums were expended for removal of rocks at the following places; to provide safer landings for fishing boats:

Ste. Anne des Monts .....	\$150.00
L'Anse à Grisfond .....	200.00
L'Ause à Louise .....	200.00

Total expenditure to 30th June, 1900, \$6,239.79.

#### MOORING PIERS ST. LAWRENCE RAPIDS.

One pier at head of Lachine Rapids, second at head of Cascade Rapids and third three miles above the village of Cedars.

Completed in 1856, are 70 feet long by 20 wide.

Total expenditure to 30th June 1900, \$2,665.52.

#### ST. MICHEL DE BELLECHASSE.

St. Michel de Bellechasse is on the south shore of the St. Lawrence, 15 miles below Quebec, in the county of Bellechasse. The place is somewhat frequented as a summer resort. Spring tides ride 20 feet, neap tides 13 feet.

*Construction.*—A pier was built here many years ago by the municipality, it is 1,090 feet in length, 30 feet wide, with the exception of a block 75 feet long at the outer end, which is 52 feet wide, with landing steps on each side and a slip at the end, the depth of water at the outer end is two feet at low water spring tides, and the market steamer which calls here daily during the season of navigation, cannot come alongside the pier at low water, and freight and passengers, at such times, have to be landed from a bateau, at a great disadvantage. The pier is built with nine inch opening, between each face timber of 12 inches square, and filled with stone ballast. In 1882 the sum of \$262.66 was expended in removing boulders which obstructed the approach to the pier. In 1886 the department assumed the pier, and owing to its dilapidated state various amounts were expended nearly every year until 1893, inclusive, when the amount of \$6,621.06 had been expended in repairs. In 1894 the north-east side was sheathed on a length of 485 feet with 3-inch planks, to prevent the top planking being damaged by the effects of the waves, and \$509.78 were expended. In 1895 the sheathing, commenced the year previous, was continued on a further length of 270 feet and the planking and stringers were renewed on a length of 326 feet at a cost of \$802.23. In 1897 an open shed 40 x 22 feet, part of which is occupied as a combined freight shed and waiting-room, was built by contract at a cost of \$690. The eastern and western sides are clapboarded and the roof covered with sheet iron, the slip was partly covered with 3-inch planks, the top planking was renewed on a length of 500 feet and a pathway, 3 planks wide, was laid on the middle of the pier, the amount expended being \$1,034.82.

During the fiscal year 1899 the capping was renewed on a length of 1,100 feet as well as 750 planks in the top planking and an oak fender was placed at the outer western corner, at a cost of \$406.

During the last fiscal year the renewal of part of the pier was continued, 650 planks being employed and 820 feet of capping, other trifling repairs were effected at a cost of \$400.84.

The total amount expended on repairs and improvements for this pier is \$10,037.39.

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## ST. NICHOLAS.

St. Nicholas is a prosperous village on the south shore of the St. Lawrence, 14 miles above Quebec, in the county of Lévis. For many years a small steamer has called at this place for the considerable traffic in farm produce derived from the surrounding fertile country. The steamer landed at a private pier, the outer end of which was carried away by ice in the spring of 1896. The owner being unable to repair it in a suitable manner, it could only be approached at high tide and with great inconvenience, the inhabitants of the place therefore requested the government to purchase the pier and place it in serviceable condition. Spring tides rise 19 feet; neap tides, 12 feet.

*Construction.*—During the fiscal year 1899 the pier was purchased by the Dominion Government, and the reconstruction of the top part was commenced in the month of July. The head was entirely rebuilt from the bottom on a length of 20 feet, 45 feet wide and 33 feet high, with 12 by 12 inch timbers, which were joined to the timbers of the old pier, the top of which was rebuilt on a height of 6 feet, 21 feet wide on a length of 312 feet, a movable slip, raised and lowered by means of winches and chains, was built at the outer end, the outer face and 20 feet on each side were sheathed with elm timber 7 inches thick, elm fenders were placed every 10 feet on both sides and sheathed between with 3 inch pine planks reaching to within 5 feet of the top, the old approach was entirely rebuilt from the bottom, on a length of 125 feet an average width of 20 feet, the whole pier was covered with 3-inch pine planks. The pier is now 332 feet long, outside of the approach, 21 feet wide, and for a length of 96 feet it tapers out to a width of 45 feet at the outer end, the top is 4 feet above high water ordinary spring tides, and the outer end stands in 10 feet of water at low water spring tides.

The total amount expended on reconstruction is \$8,497.26.

## ST. ROCH DES AULNAIES.

St. Roch des Aulnaies, is situated on the south shore of the St. Lawrence, in the County of L'Islet, 70 miles below Quebec. Spring tides rise 18 feet; neap tides 12 feet.

In order to facilitate the loading and unloading of schooners carrying the freight of the locality, a sum of \$5,000, was voted by Parliament at its session of 1899, for the construction of a pier at this place and in the month of June of the same year a contract was entered into for its construction for the bulk sum of \$6,087.00.

The work consists of a stone approach 230 feet long, 15 feet wide at top, of a mean height of 10 feet and built to a slope of 1 in 1 at the sides; thence in a westerly direction, parallel to the shore, of a block of closed-faced cribwork 150 feet long, forming an L with stone approach and affording shelter for schooners inside the bay; the cribwork is 20 feet wide at the top with a batter of 1 in 12 at the sides, at high water spring tides a depth of 14 feet 8 inches is found at the head of the pier.

The work was not completed at the end of the fiscal year; the progress estimates and preliminary expenditures amounted to \$4,473.72.

## ST. SIMEON.

St. Siméon, County of Charlevoix, is on the north shore of the St. Lawrence, 108 miles below Quebec.

Spring tides rise 20 feet, neaps 12½ feet.

In 1891 a cribwork block was constructed 50 feet by 40.

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In 1893 repairs were made by removing face timbeas, placing fenders and repairing steps.

Total expenditure to 30th June, 1900.—\$5,959 96.

## ST. TIMOTHÉE.

St. Timothée is in the county of Beauharnois, on the south shore of the St. Lawrence, at the head of the Chute aux Bouleaux Rapids.

During the fiscal year 1882-83 a landing pier was constructed at this place, consisting of a block 100 feet by 24 feet, having from  $6\frac{1}{2}$  to  $7\frac{1}{2}$  feet of water along its front, and a roadway to the shore 237 feet in length and 20 feet in width, of stone, earth and gravel.

The expenditure was \$1,841.46. The landing pier was damaged by ice during the breaking up of the St. Lawrence during the spring of 1884, and during the fiscal year the sum of \$187.21 was spent in replacing it.

During the summer 1889 the wharf was extended out 45 feet, the extension being 45 feet by 100 feet. The steamers have no trouble in swinging round since the construction of this extension.

The expenditure being \$3,773.15.

During the fiscal year 1899-1900, a number of stringers and the flooring were renewed, the storehouse and waiting room was repaired and painted, a cattle yard, 60 feet by 15 feet, was made at the inner angle of the wharf alongside the roadway, with stone and earth and fenced in, the roadway was also repaired. The expenditure was \$801.45.

The total amount expended on this work is as follows :—

Construction.....	\$1,841.46
Repairs.....	187.21
Construction of extension.....	3,773.15
Repairs.....	801.45
	<hr/>
	\$6,603.27

## ST. VALENTIN.

The village of St. Valentin, in the county of St. Johns, is situate on the west shore of the river Richelieu, 12 miles above or south of the town of St. Johns. As this place had no wharf accommodation, the large quantity of hay which is annually exported to the United States ports of Lake Champlain, and the farm produce shipped to St. Johns, had to be conveyed in scows to barges anchored in the channel of the river, which necessitated double handling and correspondingly heavy expense. In order to provide the required landing facilities a sum of \$5,500 was appropriated in 1897, towards the construction of a landing pier at the foot of the Government road leading from the post-road to the Ile aux Noix ferry, and for raising and repairing this road which is annually flooded and damaged during the spring freshets. On the 17th of March, 1897, a contract was entered into with Messrs. Messier and Naylor for the construction of the proposed works. The work was well under way at the close of the year 1896-7, and was completed in 1898 at a total cost of \$6,612.43.

The landing pier, measured on its centre line, is 326 feet long, and consists of a stone and earth embankment 135 feet long and 25 feet wide with side and end slopes of 1 in 1, of a trestle approach averaging 156 feet in length and 20 feet wide, and of a head block of solid cribwork 35 feet long and 60 feet wide along its channel face. The outer face of the head block is  $19\frac{1}{2}$  feet in height above the bottom of the river and stands in  $9\frac{1}{2}$  feet of water at low water. The

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Government road was raised above the level of the spring freshets, and properly fenced in.

Total expenditure to 30th June 1900, including dredging, \$6,891.66.

## ST. ZOTIQUE.

The St. Zotique pier is situated on the north shore of Lake St. Francis, and the county of Soulanges, about  $2\frac{1}{2}$  miles above Coteau Landing. It consists of a block or a wharf proper, 132 feet 4 inches in length by 24 feet in width, while the approach of 34 cribs placed at intervals of 20 feet, varies from 8 to 12 feet in width.

During the fiscal year 1893-94 the following works were executed, viz :—

1. The superstructure of the block or wharf proper was rebuilt and floored with 3-inch pine plank.
2. The three piers which had been shoved by the ice and damaged were rebuilt and the stringers renewed.
3. One ice pier 15 x 20 feet was built and properly ballasted.
4. The approach, on a length of 653 feet, was covered over with 3-inch pine plank.

The expenditure during the year amounted to \$2,490.73.

Total expenditure to 30th June, 1900—\$17,095.72.

This work was transferred to control of Department of Marine and Fisheries on 28th August, 1896.

## THREE RIVERS.

*Three Rivers.*—The City of Three Rivers is situated on the northern bank of the river St. Lawrence at the mouth of the river St. Maurice and covers an area of 9 square miles. It is half way between Montreal and Quebec (71 miles below Montreal and 68 above Quebec) and is the capital of the district.

During the year 1889 and 1890 a wharf was constructed between the Riche-lieu Company's wharf and that of the Harbor Commissioners.

It has a frontage of 172 feet on the St. Lawrence, is 36 feet 1 inch in height, and stands 11 feet above mean low water and is 20 feet wide on top.

## TICOUABE.

*Ticouabe*, a post village in Chicoutimi county, is situated at the outlet of the river of the same name, 21 miles from Roberval.

A small landing was built at this place during the year 1897-98 to accommodate the local traffic and to help its development. This wharf consists of a solid block of close-faced cribwork 30 feet by 30 feet built a small distance from the shore and connected to it by a platform, supported on trestles, 103 feet long and 25 feet wide. A combined freight and shelter shed 25 feet by 30 feet was also built. Total cost of construction \$1,611.79.

## TROIS PISTOLES.

Trois Pistoles is in the county of Témiscouata, on the south shore of the St. Lawrence, 148 miles below Quebec and 25 miles east of River du Loup. Spring tides rise 18 feet, neap tides 11 feet.

*Construction.*—During the year 1882 an isolated block of crib-work, 50 feet long, 30 feet wide and 22 feet high, was built on the west side of the harbour,

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about 590 feet from the shore at a cost of \$3,500.00, this block was dry at low water, but at high water spring tides there was a depth of  $12\frac{1}{2}$  feet at its outer end, it was to be afterwards connected with the shore. During the years 1883, 1884 and 1885 the sums of \$2,545.59, \$1,511.12 and \$1,741.19 respectively were expended in extending the pier shoreward by building separate blocks of crib work at a distance of 40 feet apart and connected with stringers to support the top floor. In 1886, the sum of \$3,000.00 was expended in rebuilding part of the work carried away during a heavy storm of November, 1885. In 1887 and 1888 the approach of cribwork and gravel filling was built on a length of 385 feet at a cost of \$4,722.76. In order to afford more room for the unloading of freight and further shelter for vessels frequenting the harbour, two extensions seaward were commenced in 1889 and completed in 1891; the first extension was 60 feet long and 30 feet wide, the second, 50 feet long and 50 feet wide, with a landing slip on each side, the amount expended during the three years being \$7,750.17. In 1892 the outer spans between the isolated blocks were filled with cribwork and stone ballast to prevent the flow of tides and waves from side to side of the pier, the flooring was partly repaired, the amount expended was \$1,499.28. In 1894 an examination of the harbour was made with a view of further extending the pier, the cost of the examination was \$14.15. In 1895 the remaining open spaces between the isolated blocks were filled with cribwork and stone ballast, part of the top floor was renewed and a railing was built on both sides of the pier and approach for a length of 350 feet, at a total cost of \$999.00.

The main body of the pier is now 360 feet long, 50 feet wide on a length of 50 feet at the outer end, 30 feet wide on a length of 110 feet and 20 feet wide on a further length of 200 feet shoreward, the height of the structure at its outer is 22 feet. The approach is on a curved line 386 feet long and 20 feet wide; the depth of water at the outer end of the pier, during high water spring tides, is 13 feet. In 1896 projecting rocks and boulders were blasted and removed from the harbour at a cost of \$493.90.

*Repairs.*—During the last fiscal year three pieces of face timber, which had been broken by ice, were renewed; the top planking was partly renewed; three fenders replaced, the plank walk on the approach was renewed on a length of 390 feet and 10 toises of stone ballast were put in where required; the work was done by day labour at a cost of \$300.38.

The total amount expended on this work is \$28,077.54, as follows:—

Construction and improvements.....	\$ 27,283 26
Removal of boulders from harbour.....	493 90
Repairs .....	300 38

Total..... \$ 28,077 54

This wharf was transferred to control of Department of Marine and Fisheries on 10th May, 1895.

#### VALOIS. (POINTE A VALOIS)

Pointe à Valois, county of Vaudreuil, is situated on the south shore of the Lake of Two Mountains and  $4\frac{1}{2}$  miles west of the village of Vaudreuil, which is the nearest railway station and  $2\frac{1}{2}$  miles east of Como. In 1889-90 the old pier at this place, measuring about 80 feet by 16 feet: with head block of 45 feet by 20 feet and the right of way to this pier, was purchased from Charles Valois for the sum of \$600.

During the fiscal years 1890-91-92, the original pier was extended by adding, at the outer end, a block of ballasted cribwork 135 feet long by 21 feet wide, with a return to the eastward 55 feet by 25 feet; the total length of the work from the shore being thus increased to 225 feet. The depth of water available at the outer end of the wharf is now  $6\frac{1}{4}$  feet at low water.

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During the fiscal year 1896-7, a sum of \$210.77 was applied in effecting general repairs on this wharf.

Total expenditure to 30th June, 1900, \$5,261.33.

This wharf was transferred to control of Department of Marine and Fisheries on 6th October, 1897.

## VAUDREUIL.

Vaudreuil is situated in the County of Vaudreuil, on the Ottawa River, about 25 miles above Montreal.

In 1888 a wharf was constructed 324 feet long, 20 feet wide with the outer block 30 by 20 feet.

Total expenditure to 30th June, 1900, including dredging, \$3,465.25.

## VERDUN.

Verdun, in the county of Jacques Cartier, is an incorporated and post village, it is situated on the north shore of the river St. Lawrence, about 2 miles west of Montreal. It contains one Roman Catholic church, many stores, hotels, etc., it has water works and sewers. The population of about one thousand is fast increasing. A steamboat ferry is open to Côte St. Catherine on the opposite shore of the St. Lawrence, for passengers and carriages, making four trips daily.

In order to give better accommodation to the farmers of the south side of the St. Lawrence to take their produce to Montreal by the ferry boat, it was decided to build a permanent wharf at Verdun. The structure commenced in October 1899 was completed in June 1900, it consists of a head block 82 feet long by 20 feet wide of solid cribwork, terminated at its upper stream end by an ice-breaker; the approach from the shore to the block is also of close faced cribwork 75 feet in length by a width of 18 feet. The outer face of the block stands in 6 feet at extreme low water.

The work was carried out by day labour at a cost of \$2,353.23.

## VICTORIA. (Megantic village.)

Victoria Bay is situated in the township of North Marston in the county of Compton. In 1885-86 a small pier was built at this place for the accommodation of the local trade at a cost of \$845.20 and some slight repairs were made to it in 1889-90 at a cost of \$80.00.

Construction.....	\$854 20
Repairs.....	80 00

Total expenditure to 30th June, 1900.—..... \$934 20

This pier is also known as Megantic village which was transferred to control of Department of Marine & Fisheries on 7th June, 1892.

## YAMACHICHE.

The village of Yamachiche is situated in the county of St. Maurice on the north shore of the River St. Lawrence, 16 miles above Three Rivers, at the foot of Lake St. Peter.

To provide wharfage facilities a contract was entered into for the construction of an isolated pier, measuring 24 feet by 48 feet at the outlet of the River Yamachiche.

At the beginning of the fiscal year work of construction was in progress, and was completed on the 11th September, 1893.

In April, 1894, two of the mooring posts were broken by the ice, and these were renewed during the month of June. The total expenditure on this wharf during the year amounted to \$1,169.55.

Total expenditure to 30th June, 1900, \$6,633.02, including \$4,825.32 for improvement of river.

## PROVINCE OF ONTARIO.

### BAYFIELD.

The village of Bayfield, in the county of Huron, is situated at the mouth of the river of the same name which empties into Lake Huron, 12 miles south of the town of Goderich. It contains one grist and saw-mill.

*Construction.*—The harbour of Bayfield was originally formed by the municipality of the township of Stanley, and in 1874 when the Dominion Government took the work in hand, it consisted of two piers, 618 and 620 feet in length, 200 feet apart at the outer end and 330 feet at the inner or land end. No statement of the expenditure made by the municipality can be given. In 1874, an appropriation of \$34,000 was made by Parliament for the improvement of this harbour, the municipality of Stanley contributing \$10,000. The work was placed under contract in November, 1874, and proceeded with during the seasons of 1875-6 and 1877, the total expenditure from 1874 to 1882 being \$61,517.55.

The improvements as then completed consisted of a prolongation of the northern pier 105 feet on the outside, with an arm of 156 feet, turned to the south-west: of a pier on the south-side generally parallel to the main line of the opposite pier 180 feet distant from it, and 553 feet in length, with a return towards the coast line of 153 feet, all the cribwork being 20 and 30 feet wide. The depth of water at the entrance, which was originally 11 feet, was reduced to about 6 feet in 1894, due to the formation of sand bars.

*Repairs.*—During the years 1884, 1885, 1886 and 1887 repairs were made to the piers, especially to the northern pier which was close-piled on both sides. The small crib at the west end was also repaired, the expenditure of these years being \$6,157. In 1897-8 the sum of \$2,231.36 was expended in the reconstruction of a portion of the northern pier 245 feet in length, and repairing the outer end of the same structure. The whole of the repairs contemplated were not completed at the close of the year and a further sum of \$1,550 was appropriated, and the work completed during the year 1899 at a cost of \$1,521.23. Dredging also was performed in the harbour by Messrs. Bowman and Porter's plant, which worked 130 hours and removed 5,460 cubic yards of material at a cost of \$1,200, including inspector's wages. The amount expended during the fiscal year 1899 was \$2,721.25.

On the 28th August last authority was given to expend the sum of \$5,300.00 in closing the "gap" in the shore end of the north pier, a length of 270 feet, by cribwork 20 feet wide and continuous superstructure, and to repair the south pier where required, a length of 705 feet and 30 feet wide, and the whole of this work was completed in June last, at an outlay of \$4,683.98.

The total expenditure at this place to date may be subdivided as follows:

Construction.....	\$61,517.55
Repairs and reconstruction.....	15,118.41
Dredging.....	1,200.00

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\$77,835.96



## BEAVERTON.

Beaverton is situated at the mouth of the Beaver River, on the east shore of Lake Simcoe, in the County of Ontario. It is a station on the Midland Division of the Grand Trunk Railway, about 70 miles from Toronto. Population 1,000.

In 1891 this Department built a landing pier, consisting of an embankment approach 285 feet in length, and crib and superstructure work 840 feet, or a total length of 1,125 feet, for the accommodation of vessels plying on Lake Simcoe, giving a depth of water at the outer end of about 8 feet. The contract was let in February and the work completed in the following June. The cost of this structure was \$8,180.00. In 1882, the department constructed a breakwater 320 feet in length at the mouth of the River, on the north side, at a cost of \$1,000.00.

During the past fiscal year repairs were made to the flooring and approach, costing \$194.77.

Total amount expended at this place to date :—

Construction.....	\$ 10,081.96
Repairs 1893-94.....	150.00
Repairs 1899-00....	194.77
	<hr/>
	\$ 10,426.73

## BELLE RIVER.

Belle River, County of Essex, is situated on the southern side of Lake St. Clair, midway between the mouth of the Thames and Detroit Rivers.

A small length of pile protection work was built in 1884 at the mouth of the River, with the view of protecting the shallow channel which has been formed to permit boats and scows to enter and ascend the river.

The Municipality has assisted in the construction of these works.

## BIG BAY.

Big Bay is situated in the county of Grey, at the entrance to Colpoy's Bay on the Georgian Bay, about 15 miles north of Owen Sound Harbour. There is a small village at this place and the trade is a limited one of timber, cordwood and poles.

The landing pier was constructed in 1877 by the municipality, at a cost of \$933 towards which the government granted \$400. The pier was then 335 feet in length and reached out to 6½ feet of water. In 1881 the pier was extended 117 feet into 11½ ft. of water, at a cost of \$1,121.41, of which sum the Government paid \$500.

In 1891 the department repaired the pier, rebuilding, where required, the whole of the cribwork blocks from low water level to flooring, and replanking the whole of the superstructure and constructed a crib 25 by 25 feet, placing same inside the space between the outer crib and the adjoining one, thus giving a solid block of cribwork 90 feet long on the east side and 65 on the west. The above work cost \$2,065.

During the year 1898 necessary repairs to the flooring and stringers were made at a cost of \$54.60.

The total amount expended on this work up to date is \$4,225.40.

## BOWMANVILLE.

Bowmanville, or Port Darlington, is situated on the north shore of Lake Ontario, county of Durham, 43 miles from Toronto by rail on the Grand Trunk division of the main line between Toronto and Montreal. Population, 3,500.

*Construction.*—This harbour, which was built by the municipality, consists of two parallel piers built at the mouth of a small creek. The western jetty is built of cribwork 1,180 feet in length and 20 feet in width, excepting at the outer end, where the width is 60 feet for the last 240 feet. On this enlarged portion stand a storehouse and a lighthouse. The top of the piers is 7 feet above extreme low water level. At the outer end there is about 11 feet of water, the total height of the work being about 19 feet. No statement is obtainable as to the amount expended by the municipality in connection with this harbour. Up to 1897 no construction work was done by the department, but the entrance channel and inner harbour having a tendency to silt up, were maintained by dredging by the Dominion Government.

*Repairs.*—In 1897-8 the eastern pier was repaired and some 500 feet of pile protection work was built on the harbour side to prevent the constant filling in of sand in the channel, and the outer end of the western pier having been destroyed by storms was rebuilt. During the fiscal year 1899, the whole of the east pier has been replanked and where necessary new stringers have been placed in; the face timbers of the north end of the east pier have been renewed where required. To perform this work some 83,569 feet, board measure, lumber, and 1,575 pounds of iron were used, costing with labour \$2,000.

In August last, authority was given to expend a further sum of \$5,000.00 to continue the pile protection work along the harbour face of the eastern pier, a distance of 600 feet, and to protect the bank of the harbour on the eastern side of the basin.

This work was all completed in June last.

The amount expended during the fiscal year ending 30th June last, was \$5,000.00.

The total expenditure on this work, not including dredging, is as follows:—  
Repairs and reconstruction—\$10,999.99.

#### BRUCE MINES.

Bruce Mines is situated in the Algoma District on the north shore of Lake Huron, 45 miles south-east of Sault Ste. Marie. Population, 1,500.

Only private wharfs have been constructed at this place. In 1881-2 this department expended the sum of \$1,581.33 in dredging a channel to give accommodation to vessels drawing 14 feet of water.

In April last a contract was let to Messrs. Lemoine & Fortin to construct a landing pier and for dredging. The pier work consisting of a landing block 90 feet square, the outer 20 feet of which is ballasted close-faced cribwork the full width of 90 feet and the remaining 70 feet pile work; a trestle work 450 feet in length and 20 feet in width of pile bents, 12 feet 6 inches apart, and an approach 750 feet long consisting of stone embankment with gravel roadway. Total structural length 1,290 feet.

The contract price is \$12,550.00; work was commenced in May last and good progress has been made up to the end of June.

The total amount expended upon the above contract for the past fiscal year is \$1,600.00.

The total amount expended at this place by the Department up to date is:

Dredging 1881-2.....	\$1,581.33
Contract work, construction.....	1,600.00
	<hr/>
	\$3,181.33

## BURLINGTON CHANNEL.

Burlington Channel, in the county of Wentworth, is simply a cut through a piece of low land which partly separates Lake Ontario from a large sheet of deep water called Burlington Bay, enabling vessels to reach the wharfs at the city of Hamilton. Both sides of the canal are lined with piers.

*Construction.*—The work was commenced under commissioners in 1825. It was opened for the passage of vessels in 1830, and completed as originally undertaken in 1832, at a cost \$124,356.08. The works were afterwards extended, improved and partly reconstructed by the provincial government at an outlay of \$308,328.32, previous to Confederation. From 1867 to 1882, inclusively, the superstructure of the piers having been partly destroyed by fire, was renewed by the Government at a cost of \$30,426.89. It was maintained by the Railways and Canals Department till 1885, when it was placed under the control of the Department of Public Works. The general form of the canal has not since been changed, and consists of a cut through a sand bar about 2,700 ft. in length, with an average depth of 14 feet at low water, both sides of the cut being lined with vertical-faced cribwork piers. The northern pier has a total length of 2,307 feet and a general width of 20 feet, excepting at the outer and inner ends where there are blocks 30 and 35 feet wide. The southern pier has a total length of 2,710 feet and a general width of 20 feet, excepting at the outer end where there is a cribwork block of 30 feet wide for a distance of 30 feet, and at the inner end, where the cribwork is of irregular form and the width, varies from 25 to 45 feet for a distance of 590 feet. The piers are 103 feet apart at their inner ends and 174 at their outer ends. The top of the piers is 5½ feet above ordinary low water. The southern pier carries a lighthouse; above the centre of the piers, at the crest line of the sand bank, recesses were left in the cribwork on both sides for a ferry scow running across the channel. There is also a traffic swing bridge built by the Dominion Government close to the railway bridge opening on the south side. In 1895 the traffic over the channel had increased to such an extent that it was found impossible to accommodate the public, and this department prepared plans and specifications for the erection of an iron swing bridge. The contract for the masonry of this bridge was let to Mr. Geo. F. Webb, of Hamilton, in August, 1895 for the bulk sum of \$15,799. The masonry work was completed ready for the iron superstructure, in April, 1896. On January 28, 1896, another contract was awarded to the Dominion Bridge Co., of Montreal, for supplying and erecting the iron superstructure, &c., for the sum of \$15,290. All the works in these contracts have been satisfactorily completed. A further sum of \$1,500 was paid to the Dominion Bridge Co. for supplying and installing, by special agreement, an electric apparatus for operating the swing span; power is supplied by the Hamilton Electric Radial Railway Company.

In 1897-8 automatic gates to regulate the traffic at the approaches have been erected. Telephone communication has been made with the 'power house' and a 'power indicator,' for the information of the man in charge, has been placed in the bridge house. Extensive repairs were also made to the piers, which consisted in placing new faced timbers, some planking and earth filling. The whole of the repair were completed at the beginning of the fiscal year 1899 and the sum of \$1,366.75 expended.

During the past fiscal year the wages of the working staff of the bridge, and maintenance, amounted to \$2,662.08.

Repairs to bridge, etc., \$1,312.91.

Tenders were called for the reconstruction of the superstructure of the south pier, western or bay end, a distance of 989 feet from low water level up and the construction of sheet-pile work on the channel side. Work on this contract had not commenced at the end of the fiscal year.

STATEMENT of Expenditure since work is under the control of the  
Department of Public Works.

Years.	Construc- tion.	Repairs	Staff and Main- tenance.	Totals.	Description.
		\$ cts.	\$ cts.	\$ cts.	
1885-86		210 50	3 20	213 70	Putting in good order ferry landing, and and procuring new lines for ferry.
1886-87		205 79	512 19	807 98	Minor repairs and maintenance.
1887-88		128 25	505 13	723 38	" " "
1888-89		115 22	702 04	817 26	" " "
1889-90		842 78	577 88	1,420 66	" " "
1890-91			702 04	702 04	Maintenance.
1891-92		310 00	639 96	949 96	Providing channel with life line and two buoys. In November the water was so low that it was found impossible to float the scows close to the landings. Temporary pontoons were built and used until the water rose.
1892-93		301 70	714 69	1,016 39	General repairs to piers and ferry ap- proaches.
1893-94		1,563 52	692 71	2,256 23	New scow built, which was shortly after- wards lost during storm. The old scow was then again repaired at a cost of \$434.80. Extensive repairs to stringers and flooring of the piers were also made.
1893-94	Bridge	\$1,416 38		1,416 38	Surveys, plans, &c. for proposed bridge.
1894-95		800 02	689 96	1,489 98	Repairs made to east pier.
1895-96			820 96	820 96	Staff and Maintenance.
1895-96	Bridge	\$3,816 25		3,816 25	A road approach 400 feet in length was constructed to connect the swing bridge with the road. On south side of chan- nel a crib 70 x 20 feet was built with superstructure to fill in approaches of the ferry landing.
1895-96	Bridge	\$19,937 13		19,937 13	Bridge, masonry, &c.
1896-97		1,454 24		1,454 24	Repairing piers, retaining walls, fences &c.
1896-97	Bridge	\$16,520 92	1,556 87	18,077 79	Bridge.
1897-98		3,525 37		3,525 37	Repairs to piers.
1897-98			2,520 58	2,520 58	Bridge staff and maintenance.
1898-99		1,306 75	2,868 58	4,235 33	Bridge staff. Repairs and maintenance.
1899-00		1,312 91	2,662 08	3,974 99	" " " "
Totals,		41,690 68	16,268 88	70,186 61	

COBOURG.

Cobourg is an incorporated town of Ontario, in Northumberland county, situate on the north shore of Lake Ontario, on the Grand Trunk Railway, 92 miles west by south of Kingston, 69 miles north-east of Toronto, and is a port of entry. It has several mills, foundries, breweries, and a car factory, Population, 5,000.

*Construction.*—The work of forming a harbour at Cobourg was commenced by a company organized under an Act of Parliament in 1829. In 1842 the works were assumed by the government and held until May 27, 1850, when they were sold to the town council of Coburg for the sum of \$16,000. Prior to the union of the provinces in 1841, the government had spent \$20,010.72 on this harbour; and after the union the sum of \$41,999.98 was advanced as a perpetual loan at 6 per cent interest. At the time of confederation, the work consisted of two piers, the

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united length of which was 2,047 feet. They were 190 feet apart at the entrance of the harbour, the depth at the outer end of the eastern pier being 14 feet, decreasing from 7 to 8 feet in the centre of the basin. In 1873, an agreement was entered into with the harbour commissioners for the construction of a pier 1,500 feet long, the commissioners to pay one-third of the cost and the government to pay two-thirds. Under this agreement the total expenditure was \$79,569.68, of which the harbour commissioners contributed \$25,507.49. In 1881-2 an arm 150 feet in length, in a south-easterly direction, was commenced, and an expenditure of \$8,291.20 was made. The total expenditure by the department since confederation up to 1882 was \$92,161.89. In 1882-3, 1883-4 and 1884-5, the piers were further extended, especially the eastern pier, and some of the cribwork raised owing to a sinking in soft bottom. The expenditure during these three years was \$47,525.73. In 1885-6 and 1886-7 the sum of \$10,208.01 was expended in building a crib 100 feet in length at the outer end of the eastern pier, and the next 300 feet shorewards, which had settled on an average of 8½ feet, was built up to its proper height; repairs were also made to the western pier. In 1887-8 a contract was entered into for rebuilding a portion of the western pier, which was completed in 1888-9 at a cost of \$9,871.53, out of which about \$2,000 were for repairs to the western pier of the original harbour. From 1889 up to June 30, 1897, the east and west piers were alternately repaired and some portion renewed, at an expenditure for these years of \$13,525.59. Some extensive dredging was also done in the harbour, but the expenditure is not included in this report. In 1897-8 repairs were again made to the shore end of the western pier, and its approach, and the walings and planking on the eastern pier renewed. The expenditure was \$2,999.86. Some slight repairs were made during the year 1899 amounting to \$25.

The harbour as constituted consists of three main piers, the eastern central and western piers. The eastern and central piers from the old harbour proper. The eastern pier which is built of cribwork with some enlargements of pile work and gravel filling, is 1,490 feet in length and is built from the shore in a southerly direction, with a return L 140 feet long in a south-west direction. The width, which is very irregular, is 30 feet at the outer end and 60 feet generally at the shore end. The front of this old harbour is lined with cribwork 800 feet long. About 380 feet from this front wall, and from the eastern pier, starts a small pier 305 feet long and from 18 to 35 feet wide, running in a westerly direction towards the central pier. The area inclosed between this short spur, the shore portion of the eastern pier, the front wall and the central pier, is called the inner harbour. The depth of water there is from 6 to 13 feet at low water. The central jetty is in very bad repair. It is 1,160 feet long including the approach, and the width is from 30 to 35 feet. The inner and outer ends are respectively 780 feet and 160 feet west of the eastern pier. The western pier, which was built by the Dominion Government, is located about 1,200 feet west of the eastern pier, has a total length of 1,660 feet, and a regular width of 30 feet. It runs from the shore in a southerly direction with a return L towards the eastern pier, 150 feet in length. The depth of water in this enlarged harbour varies generally from 6 to 15 feet at low water. The top of the cribwork above low water level is from 6 to 8 feet. On the eastern pier there is a lighthouse and some store sheds.

The total expenditure made by this department on this work is \$176,752.58, and may be subdivided as follows:—

Construction.....	\$ 155,767 16
Repairs.....	20,985 42
Total.....	\$ 176,752 58

## COLLINGWOOD.

Collingwood is situate on the south side of the Georgian Bay, towship of Nottawasaga, county of Simcoe, 94 miles by railway from Toronto. It is the terminus of the Northern and Hamilton and North-western railways. There is an extensive trade in grain and lumber and it is the starting point of steamers for Owen Sound, Sault Ste. Marie, Parry Sound, etc. Population 9,000.

*Construction.*—Prior to Confederation a pier and lighthouse was erected, but it was completely swept by a storm in 1872. In 1873 the work of reconstruction was commenced and was completed in 1874 at a cost of \$57,468.43, one-half of which was paid by the department, one-quarter by the Northern Railway Company, and one-quarter by the town of Collingwood. This breakwater is of unusual strength. It is 700 feet in length and finishes, at the deep water end, in a broad pier head 60 feet long by 80 feet wide, on which a lighthouse has been erected. The width at the base of the cribwork is 24 feet, receding to 19 feet 6 inches at water line. The portion above water is carried up to the height of six feet, terminating at 12 feet 6 inches in width. The depth of water in the harbour was 11 feet; but as the size of the vessels navigating Lake Superior increased, this depth was found insufficient and during the season of 1879 and following years, dredging was commenced for the purpose of increasing the depth to 14 feet at low water. The total expenditure since Confederation up to 1882 was \$84,636.32, being \$57,468.43 for construction and \$27,167.89 for dredging. In 1882 a contract was entered into with Mr. J. D. Silcox (who subsequently assigned his contract to Messrs. Fleming, Lindsay and Burdet), for the construction of a length of 600 feet of a breakwater, extending northwardly from the north wharf, or G. T. R. wharfs. This contract was completed in 1883. In November of the same year another contract was entered into with Mr. Rob. Reed for the sum of \$18,613 for a further extension of 600 feet, which was completed in 1884. In 1884 the work of dredging the channel at the entrance of the harbour was continued and the deepening of a basin at the southern end of the harbour was commenced. In 1885 a new contract was passed with Mr. E. Murphy for another extension of this breakwater for the sum of \$19,000. The expenditure during 1883-84-85 and 1886, on account of construction was \$100,919.58. In 1887-88 a contract was entered into for the construction of stone rip-rap work to close the opening between an old slab wharf and the western end of the outer breakwater. It was completed in 1889 at a cost of \$12,285.35; some boulders, logs, etc., were removed from the entrance channel in 1889 at a cost of \$3,808.09. Since 1889, dredging has been carried on by the department almost every year, deepening the water in the harbour generally as well as at the many wharfs. In the year 1897 a contract was let to Messrs. Boon & Armstrong, of Toronto, to deepen and dredge the harbour to 16 feet below low water level. On the 3rd of July, 1897, operations were commenced and continued until the close of the year. Owing to the hardness of the material removed and many breakdowns in the dredging machinery, the work had not progressed as fast as was expected. The expenditure on this contract was \$31,472.39.

*Repairs.*—In 1884-85, repairs were made to the outer breakwater at a cost of \$4,214.71, and from 1893 up to 1898 the sum of \$3,013.21 was expended in minor repairs to the breakwaters and the foundations of the lighthouses. As constituted now the harbour is very large and commodious, being protected on the north and east side by extensive breakwaters, 1,500 feet and 3,600 feet in length. Several small wharfs belonging to the town or to companies, are built inside the area enclosed by these breakwaters.

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On April 29th, 1897, a contract was let to Messrs. Boone & Armstrong, of Toronto, to deepen and dredge the harbour. On July 3rd., 1897, operations were commenced and have been continued during the working seasons, but owing to the hardness of the material removed and many break-downs in the dredging machinery, the work did not progress as fast as was expected, and in May last the contract was annulled and a new agreement entered into with Mr. C. S. Boone, narrowing the channel leading into the harbour from 300 feet to 110 feet wide, and deepening same to 22 feet below zero of gauge, thus giving 20 feet at low water level from the range light inwards, and tenders were asked to carry the same depth from the range light out into the Bay.

The work under the new agreement has been proceeded with, and good progress made with same, and up to the 30th June, last, the contractor had removed 15,715 cubic yards.

The amount expended in dredging on the Messrs. Boone & Armstrong contract is, 1897-8-9, \$81,525.00.

The total expenditure on this harbour since confederation is : \$299,343.90.

Construction and improvements.....	\$170,673.36
Dredging and deepening.....	120,389.52
Repairs, &c.....	8,281.02
Total.....	\$299,343.90

## DYER'S BAY.

Dyer's Bay is situated on the west side of Georgian Bay, about 25 miles north of Wiarton. In 1894 the government constructed a wharf at this place 210 feet in length, and 20 feet in width at a cost of \$3,180.00.

In July, last, repairs were necessary and some 1,000 ft. b.m. of lumber, 725 f.b.m. of 3-inch plank and 150 lbs. of iron were used in the repairs, at a cost of \$63.83.

Total expenditure to end of fiscal year :

Construction.....	\$3,180.00
Repairs.....	63.83
	<hr/>
	\$3,243.83

## GODERICH.

Goderich, in the county of Huron, is situated on the east shore of Lake Huron at the mouth of the Maitland River, about 68 miles from Sarnia and 60 miles from London. It is the terminus of the Buffalo branch of the Grand Trunk Railway, and is a place of considerable importance, partly on account of large deposits of salt found in its vicinity.

*Construction.*—The construction of a harbour at this place was first undertaken in 1835, by the Canada Company, who held the right under a lease from the Crown, although a considerable expenditure was made on the works, they were allowed to fall into decay. In 1859 the Canada Company transferred their claim on the harbour to the Buffalo and Lake Huron Railway Company (now part of the Grand Trunk system), who in 1862 were granted a new lease from the Crown, under which the company erected extensive harbour works. When it was determined by the government to establish harbours of refuge on Lake Huron, Goderich was one of the points selected as most suitable, and a survey was made and plans prepared for creating a safe and commodious harbour. The plan adopted may be briefly described as being that of changing the entrance to the harbour by cutting a new channel through the beach and protecting it by cribwork built

out to a depth of 17 feet at low water; of considerably increasing the area of the harbour by dredging, and of diverting the channel of the River Maitland by the erection of an artificial bank, so that the river should discharge into Lake Huron through the north beach and not flow into the harbour at all. These works were commenced in 1872 and completed in 1877, the cost being \$465,715.81. In 1881 and 1882 dredging to the extent of \$1,748 was done, and in 1882 \$2,387.06 was spent in protection work at the beach between the northern pier and the breakwater, which was gradually being washed away. The total expenditure up to 1882, since confederation was \$471,531.16 on account of construction and dredging.

In 1882-3 the sum of \$22,500, was awarded by the official arbitators, and paid to Mr. S. Platt for damage to his property in connection with the harbour works. On account of the contractor for the construction of beach protection works abandoning his contract, the Government was obliged to assume and proceed with the work, the expenditure during the year on account of construction being \$4,034.04. This beach protection was completed in 1884 at an expenditure of \$2,860.16. In 1882-3 a contract was entered into with Messrs. Brewder & McNaughton, of Ottawa, to extend the northern pier 410 feet, and the southern pier 100 feet in length and to dredge berths for the same. This work was commenced in March, 1894, and the work completed in November 1895. In March 1897, a contract was let to Luke Madigan, for a bulk sum of \$50,999 to reconstruct the whole of the breakwater superstructure, a length of 2,490 feet, and rebuild six cribs 30 x 20 feet, and nine cribs 30 x 20 feet; the former to be 2 feet high and the latter 17 feet high. After a series of delays, on the part of the contractor, an order in council was passed setting aside the contract on April 25, 1898, and authorizing the calling of new public tenders for the completion of the work. The late contractor during the year 1897 stripped and exposed about 870 feet of the superstructure at the east end of the breakwater, rebuilding a portion of the same 12 feet high. The finished height is 18 feet.

On August 11, 1898, the contract to rebuild the superstructure of the breakwater, at this place, was re-let to Messrs. Smeeth & McGillicuddy, of Goderich, for the sum of \$56,700. Nothing but a long series of delays has taken place since the date of signing this contract. At the end of the fiscal year 1899 the sum of \$2,886.11 had been paid on the contract.

During the fiscal year, the first submerged crib No. 20 was sunk into position on the 18th October, 1899; another No. 17 on the 21st and Nos. 18 and 19 on the 24th.

The dredge took from the 17th October till the 20th November preparing foundations for the submerged cribs Nos. 6, 7, 8 and 9.

This dredge was at breakwater from the 3rd October until the 20th November either removing gravel from foundation of new cribs or redredging the gravel from the river which had been dumped there by permission given on the 6th October.

The work for the remainder of the season consisted of filling cribs with stone, building and filling superstructure with stone, excavating gravel and pulling down old old timber from the extreme west end over cribs 1 to 6.

*Deepening of harbour.*—The deepening of Goderich harbour was decided upon and instructions were given to that effect early in September, 1898.

The purpose was to give a depth of twenty feet between the piers from checkwater westward out into Lake Huron where the same depth of twenty feet is reached, and in the inner harbour from checkwater eastward 18 feet below low water mark.

These depths, 20 feet between piers and 18 in harbour will give nearly 22 and 20 feet respectively with prevailing elevation of water.

It was not the intention to excavate over the whole area of inner harbour as a depth of between 15 and 15½ feet over the greater part can be procured and



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vessels drawing that amount of water can reach the docks on the north side of the harbour.

That which was considered necessary was to deepen a channel and form a basin leading up to and in front of the public and elevator docks where crafts of the larger types drawing eighteen feet of water could come in at all times with safety; especially as Goderich is supposed to be a "Harbour of Refuge," but for some time back was not available for this purpose on account of its inadequacy.

On September 12 last the Marlton Dredging Company was employed to do certain dredging in the harbour and channel approach, and work was commenced on the 14th of the same month. Operations were continued until November 22, and were continued in the spring of 1899 until the end of the fiscal year, when the sum of \$9,632.41 had been expended, including superintendence, during which time the plant worked 418½ hours, which, at \$8 dollars per hour, cost \$3,350.66.

On October 11th, orders were given to make some slight repairs to the south pier at a cost not to exceed \$84. The work was at once done, the labour costing \$45.20 and the material \$30.97; total, \$76.17.

The expenditure for the fiscal year 1899 was as follows:—

Dredging.....	\$9,632 41
Rebuilding superstructure of breakwater.....	2,886 11
Repairs, south pier.....	76 17
Total.....	\$12,594 69

*Repairs.*—In 1883 and 1884 the breakwater and southern pier were repaired at a cost of \$6,000. These repairs consisted in renewing some planking and guard timber and placing some ballast stone in some of the cribs. From 1884 up to 1897 minor repairs to the breakwater and piers were made almost yearly, consisting generally in renewing timbers. The expenditure during these years on account of repairs was \$7,690.23.

*Description.*—The harbour at the present time comprises an inner basin about 25 acres in extent and two parallel jetties forming the entrance from the lake. The northern side of the basin is formed by an artificial bank 2,500 feet in length composed of very strong cribwork on the Maitland River side and of a pile work on the harbour side, the space between the two being filled in and bearing a spur track. The line of cribwork serves as a training wall to prevent the Maitland River from discharging into the harbour. The cribwork is sunk generally in 17 feet of water, and its height above low water level is 18 feet. The north entrance jetty is 1,700 feet in length, the width varying from 20 to 30 feet, with a block 40 by 45 feet at the head. The south jetty starting from the end of the curve formed by the basin is 1,600 feet in length and the width varies from 20 to 40 feet. The jetties are parallel and 200 feet apart, excepting at the outer end of the southern jetty, where the entrance is 265 feet wide. The inner angle of the harbour for about 900 feet in length is considerably shoaled up, the average depth of water in the rest of the basin is 14 feet, and in the entrance channel it varies from 13 to 15 feet. This channel is proposed to be dredged to a depth of 20 feet including the southern portion of the basin.

Dredging operations were resumed again on the 19th April, 1899, and were continued until the 2nd of October of the same year, when the dredging company were given permission to move their plant round to the mouth of the river Maitland to remove some old submerged cribs for the contractors reconstructing the breakwater.

The dredge remained in the river until the 20th November when it returned to the harbour but could do very little work, only working intermittingly from the 22nd to 29th on account of the fall storms and finally closed down operations for the season on the 29th November.

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The dredge did comparatively well at rock work during part of June but eventually came to such deep hard rock which she was unable to move without it first being blasted; that some submarine blasting had to be resorted to as quickly as possible to allow of a narrow channel at least, being pushed on up to the new elevator without unnecessary delay.

This blasting was done during July and August with the assistance of a temporary contrivance comprising a churn drill worked by hand from a flat scow.

An area of about 80 x 50 feet and  $2\frac{1}{2}$  feet deep was thus removed and a 50 foot channel formed leading to the elevator. This blasting was conducted between the 5th July and 8th August and cost \$196.78.

During 1899 the following work was performed by the dredge 42, 432 c. yds. of sand and gravel were moved: 4, 864 c. yds., of rock were removed and 4, 311 cubic yards of hard pan were moved.

The average cost for dredging sand, gravel and mud was about 13.2 cents; for rock 57 cents and for hard-pan  $36\frac{1}{2}$  cents per cubic yard.

Dredging was again resumed on the 18th April, 1900 and accomplished the following work by the 30th of June.

2,563 c. yds., of hard-pan removed.

671 c. yds. of rock removed.

18,223 c. yds., of sand, gravel, &c., removed.

Making the average cost for this portion of the year about 12.8 cents for sand, gravel, &c., about \$1.21 for rock and  $42\frac{1}{4}$  cents for hard-pan.

In order to prepare the work in inner harbour for the dredge to remove it as soon as possible in the spring, a steam plant placed on a platform standing on the ice was got ready and blasting commenced in this way on the 16th February along the dock in front of new elevator power-house for a distance of 90 feet out, and was continued until the 6th of April when the work had to be temporarily ceased on account of the unsafe condition of the ice. In the meantime a towing scow was arranged and the drilling plant was transferred to it and blasting resumed on the 26th April continuing on up to the 30th June.

The cost of this blasting between the 16th, February and 30th, June was \$1,776.38 including the steam plant, scows, &c., which are still available as well as about 40 tons of coal and 800 pounds of dynamite.

The area covered was about 17,000 square feet, holes being drilled about 3 to  $3\frac{1}{2}$  feet deep every 5 feet apart.

Total expenditure to 30th., June, 1900.—\$644.953.97

#### HAWKESTONE.

Hawkestone is situated on Lake Simcoe. County of Simcoe, 14 miles east of Barrie, on the northern division of the Grand Trunk Railway.

On the 9th April last a contract was let to Mr. W. J. Bryce, to construct a wharf at this place, 300 feet in length, to consist of an approach 150 feet long, 16 feet wide on top, and 150 feet of woodwork, being cribs with superstructure and spaces. The contract price was \$2,475.00. Good progress had been made up to the end of June.

Total expenditure for fiscal year on work performed: \$550.00.

#### HILTON.

Hilton, a small village in the county of Algoma, is situated on the north shore of St. Joseph's Island in the north passage of Lake Huron, 5 miles from Stobie, on the Canadian Pacific Railway. It contains three churches, two stores one hotel and two saw-mills. Population, 300.

The wharf at this place was originally a cribwork structure built by the municipality. It fell into a dilapidated state, and was at last completely destroyed

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by the vessels mooring to it. In 1884 the remain were sold to Bowker & Co., who rebuilt it on piles. It was later on resold to Mr. A. G. Duncan. This wharf was built at the end of a road in Hilton village, it being 270 feet long over all; the approach varying in width from 18 to 20 feet, the head pier being 90 by 100 feet. The depth at the outer end of the original wharf was 16 feet 9 inches.

*Construction.*—During the years 1886-7 and 1887-8, the department built an addition to this wharf, consisting of a block of cribwork 200 feet long by 30 feet wide, at a cost of \$10,460.30. The Hilton wharf was private property, but strong representations were made to the department in a petition dated December 27, 1884, that owing to the difficulty of navigation by night in the River Ste. Marie, steamers going to Sault Ste. Marie had to lay over night at Hilton; that the wharf at that place was too limited in extent to afford sufficient shelter to those boats and that the anchorage was not good, the water in the vicinity being deep and the rocks dangerous; and further, that private owners were not in a position and did not need to extend the wharf for their business, especially as no charges were made to vessels lying at the dock. For these reasons the department constructed the extension already described.

In 1897 representations having been made that the owner of the original wharf extended by the department as above stated, exacted exorbitant tolls for the use of the wharf; that the settlers on St. Joseph's Island were labouring under very great disadvantage on account of the extortionate charges, made on their produce, &c., landing at the wharf, it was decided, in order to secure to them fair and just terms, to purchase that portion of the wharf, which was still private property, so that the whole of the work could be under government management. In 1897-8, the sum of \$5,000 was paid over to Mr. A. G. Duncan for the transfer of his wharf, the storehouse standing thereon and the right of way (to the said wharf from the main road) to the department.

During the year 1899 the sum of \$108.73 was expended in making necessary repairs to the planking on the deck of the wharf.

Total expenditure to 30th June, 1900 is \$15,794.27.

## INVERHURON.

On eastern coast of Lake Huron, 115 miles above Port Sarnia.

Work built in 1856-7 consists of a pier 450 feet long.

## KEENE.

A new wharf 90 feet in length was constructed at the south side of the highway bridge in the village of Keene, in the Trent and Newcastle District works.

The channel to the east of the wharf was also dredged.

Those improvements have been of great benefit to navigation and the travelling public.

## KINCARDINE.

Kincardine, in the county of Huron, is situate at the mouth of the Penetangore River, which empties into Lake Huron 31 miles south of Southampton; it is the terminus of the Wellington, Grey and Bruce division of the Grand Trunk railway. Extensive salt deposits are found.

*Construction.* In 1856, two parallel lines of piers were built, 100 feet apart, the northern pier being 540 feet in length, and the southern one 290 feet. In 1868, the sum of \$4,500 was granted to assist the municipality in completing the southern pier. A considerable sum of money was also expended by the municipality in improving the harbour, the amount being placed at about \$23,000. The

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depth of water being found insufficient in the harbour, in 1872 dredging was commenced and continued until 1877, when the whole of the inner basin, about four acres in extent, had been dredged to 12 feet and the entrance to 13 feet. Up to 1882 further dredging was done giving 14 feet in the basin and 15 feet at the entrance. The entrance piers were also further extended, the direction changed and the entrance widened from 130 feet to 200 feet so as to afford greater facility for entering the harbour. In November, 1881, a contract was let for the construction of 790 feet of pile protection work on the south side of the southern pier. At the close of the year 1881-1882, the total expenditure by the department on this work was \$78,049.68, out of which about \$5,000.00 were for repairs, and a large amount for dredging.

The pile protection work was completed in October, 1882.

*Repairs and renewals.*—In 1876, the northern pier having been damaged by a storm, was repaired and the superstructure raised at a cost of \$5,000.00. During the years 1883 and 1884 repairs were made to the end of the northern pier which had been damaged by a schooner; the face of the northern pier was close piled a distance of 665 feet and sheathing was placed on its north side for a distance of 200 feet, to prevent the influx of sand into the channel. The expenditure in this connection was \$6,971.52. A further sum of \$6,155.80 was expended in 1884-85 and 1886-87 in repairing the north and south piers generally, and raising the superstructure. In 1887-88 sheet piling was commenced along the north face of the south pier to prevent its falling into the channel. In 1888-89 this sheet piling was continued on the south and east side of the basin, and pile work protection on the inside of the northern pier was extended a distance of 200 feet northwardly. The expenditure on this sheet piling protection was \$15,000.59. From 1890 to 1896, minor repairs were made to the piers, at an expenditure of \$1,848.78. In 1896-97 the outer end of the south pier was reconstructed at a cost of \$2,265.42. In March, 1897, a contract was let to Messrs. Bowman, Bowman & Porter, contractors of Southampton, for a bulk sum of \$11,000.00 to renew the superstructure of the outer end of the northern pier and strengthen the same with sheet piling on the harbour face. The superstructure was completed in November, and the sheet piling in June, 1898. Repairs were also made at the same time to the north and south pier at a cost of \$438.12.

*Description.*—The harbour at present comprises an inner basin into which flows the Penetangore River, and two jetties, 90 feet apart at the inner end and 180 at the outer end.

The east, south and west sides of the basin are built of pile work, strongly braced to anchor piles, and a platform 12 to 16 feet wide resting on walings. This line of piling starts from the bridge over the Penetangore River, on the south side of the river and runs north-west for a distance of 57 feet. It then turns at an acute angle almost south for a distance of 463 feet, forming the shore wall of the basin: then 253 feet in a direction north-west. It then returns northward towards the north jetty a distance of 140 feet, where the south jetty properly starts in a direction almost due west. This jetty is 840 feet in length and is partly composed of pile work and cribwork. The width is very irregular and varies from 12 to 30 feet. The north jetty, 1,470 feet in length from the bridge, is also partly built of pile and cribwork. The width of the pile work is generally 12 feet, and the cribwork 30 feet. The whole of the cribwork has been pile sheathed. The height of the pier is generally 10 feet above low water level; the depth in the entrance channel was at the end of the year 11 feet at low water, and in the basin from 10 to 13 feet. There are two range lighthouses on the north pier.

On 29th September last, orders were issued to expend \$6,000 in dredging the channel and basin of the harbour and the sum of \$5,982 was paid for 730 hours work, @ \$8.00 per hour = \$5,840, and inspection \$142.

In September and October last, repairs were ordered to be made to the piers and the sum of \$1,495.12 was expended upon the work, which with \$22.49 for

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laying plank in September, makes a total expenditure for the past fiscal year of \$7,499.61.

The total expenditure since Coufederation is \$156,618.24, and may be subdivided as follows :—

Construction including some dredging before 1882.	\$ 78,049 68
Repairs and construction.....	50,126 38
Dredging since 1882.....	28,442 18

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\$156,618 24

## KINGSVILLE.

Kingsville, county of Essex South, is on the north shore of Lake Erie, about 25 miles east of the mouth of the Detroit River, it is also a station on the Detroit, Essex & Lake Erie Railway.

The landing pier, at this place, is the pile structure formerly known as Mallette's dock ; being on the eastern side of the artificial harbour of refuge, formed at Kingsville ; at low water, a depth of from 10 to 12 feet is available along its outer end. The pier is 860 feet long and 22 feet wide for the first 520 feet from the shore ; 28 feet wide for the next 240 feet, and 50 feet wide at the outer end for a length of about 100 feet.

During the fiscal year 1896-97, a sum of \$173.55 was applied in making indispensable repairs. The old structure is much decayed and should be rebuilt ; in its present state the weight of a heavily loaded wagon passing over it, may break some of the piles.

Total expenditure to 30th June 1900, including dredging, is \$64,678.08.

This pier was transferred to control of Department of Marine and Fisheries 21st February 1885.

## LAKES SIMCOE AND COUCHICHING.

Lake Couchiching forms part of the boundary between the counties of Simcoe and Ontario, the former lying on the west and the latter on the east side. At its upper end Lake Simcoe, through the Narrows at Orillia, and at its lower end there are three outlets which form the River Severn. This stream carries the waters of both lakes on a north-westerly direction into the Georgian Bay, Lake Huron.

Of late years the extreme high water of these lakes in the spring has prevented the cultivation of large areas of rich land ; on the other hand, the early drying up of the water courses in the summer has resulted in the lowering of the water level, so as to interfere with the navigation.

With the object of regulating the discharge from these lakes so as to lessen either extreme, the following works were commenced in April, 1896, viz :— 1st. The widening above the low water level of the two streams issuing from Lake Couchiching, which flow through narrow gorges, in order to increase the discharge at high water. 2nd. Works for controlling the flow during the low water season by means of stop logs placed across the waterways.

The work was carried on by day labour ; during high water, unwatering had to be done by means of temporary dams.

Before the close of 1895-96 the widening at " Little Falls " on one of the streams, was completed, and half the work projected at " Big Falls " on the other, was also done.

In the fiscal year 1896-97, operations were resumed on October 15th, 1896, where left off June 30th, 1896.

The widening at Big Falls was completed and stop-logs put in on January 22nd, 1897.

To facilitate the discharge of the increased flow at high water, some excavation was also made farther down the Severn River, at the first and second chutes. This work being in the wilderness, camps had to be made, and much difficulty was experienced in getting in and out.

All the work was completed and the plant withdrawn, by the end of April, 1897. The amount of the appropriation was \$5,500.00, and the expenditure incurred \$4,540.55.

The local interests concerned hold diametrically opposite views relative to the advisability of putting in the stop-logs provided and the manipulation of the same; the property owners wanting them left out, and the mill and vessel owners wanting them kept in.

At a conference of the representatives of the different interests it was decided, as the best possible arrangement, that the stop-logs would be taken out each year on the 15th of December, and left out until the water receded to a certain mark indicating, as nearly as possible, the old ordinary low water.

Nothing further has been done on this work since 1897.

#### LIONS HEAD.

Lions Head is situated in the Township of Eastner in the northern portion of the county of Bruce and on the western side of Georgian Bay, about 35 miles to the northward of Wiarton.

Population about 300, exports lumber, ties, square timber &c.

The northern side of the harbour is formed by a beach of gravel which is working southwards and destroying the harbour. Previous to 1885 the Township and County Council built a breakwater about 150 feet in length which was not sufficient to retain the gravel.

In 1885-6 the Department made an addition of 150 feet to the breakwater, superstructure of old work thoroughly repaired, a talus of stone placed on seaward face and an approach built.

Some repairs were made in 1896.

Total expenditure to date \$11,074 23.

#### LITTLE CURRENT.

Little Current is at the passage between Cloche and Creat Manitoulin Island and on the direct route to Lake Superior for vessels taking the north channel of Lake Huron and Georgian Bay; it is about 140 miles from Collingwood.

On March 15th last, instructions were given to remove rocks in the bed of the north channel, which were a constant hindrance to the safe towing of rafts of timber. Work was commenced in March and carried on until the end of the fiscal year; the sum of \$2,329.46 being expended in blasting and removing the obstructions, which now gives a free passage through the channel. Over 1,000 cubic yards were removed.

Total expenditure on this account to end of fiscal year \$2,329.46.

#### L'ORIGINAL.

L'Original, a post village in Prescott County, on the south shore of the Ottawa River, 3 miles across the river from Calumet station on the Canadian Pacific Railway and 66 miles west of Montreal. It contains, besides the county buildings, four churches, one telegraph office, several insurance agencies, grist and saw mills, three stores and three hotels. Two weekly newspapers are published in L'Original. Population 1,000.

This wharf is the most important on the river between Ottawa and Grenville, and is the only landing for the freight and passenger traffic of the village

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and of a large extent of the county. It is used also by the large number of tourists and others visiting the Caledonia Springs. It was built a length of 534 feet, under commissioners of the provincial government, prior to the union, February 10, 1841. In 1886-7 it was found necessary, owing to the filling up of the bay, to extend it 800 feet, or to a total length of 1,354 feet, including the outer block, which is 30 feet long and 120 feet wide. The long approach to this outer block was built 22 feet wide, consisting of cribs 10 feet by 22 feet, united by platforms of an average span of 34 feet. The work was done by the municipality, aided by a grant of \$2,000 from the provincial government.

In the spring of 1884, part of the superstructure was carried away by the ice, and was rebuilt by this department in the years 1883-4-5 and in 1886, at a cost of \$7,266.49. The vote of 1883-4 was supplemented by a grant of \$1,000 from the municipality. The above amount also covers the expense of dredging made by the "Nipissing" in front of the pier during the seasons of 1884 and 1885.

In 1896-7 an examination of the wharf was made at a cost of \$191.15. It was found that the approach was in a dilapidated condition and could not long stand the constant travelling of heavy loads over its uneven roadway, and that unless it was rebuilt, this landing would have to be abandoned. Ten of the shore cribs had also been moved bodily below their original positions for distances varying from 3 to 22 feet; and parts of eight others were shifted from their foundation and partly demolished. It was therefore decided to rebuild the whole approach 1,323 feet long, from the shore to the outer block, along the lower side of the old approach. Plans and specifications were prepared and tenders called. In June, 1897, the contract was awarded to Messrs. J. N. Munroe and W. Murray, contractors, for the sum of \$13,417.12. The works included in this contract consisted of:—1. A stone and earth embankment 623 feet long and 25 feet wide at the top, with side slopes of 1 in 1 and built up to an elevation of  $19\frac{3}{4}$  feet above extreme low water. 2. A trestle approach 700 feet long and 20 feet wide, with bents 12 feet apart and composed of six piles driven 15 feet in the bottom, and covered with 4-inch planks well secured to the floor stringers.

At the end of the year 1897-8, the contract work was not quite completed, there being a number of braces yet to be laid and secured on each side of the bents.

The amount of \$13,850.27 expended on this work also covers the purchase of materials for the reconstruction of the outer block (120 feet by 30 feet) from the low water level.

During the fiscal year 1899 the contract work of 1898 was completed as described above, the outer block, 120 feet long by 30 feet wide, was renewed from low water level for a height of 19 feet, a freight shed 40 x 20 feet and a waiting room 20 x 16 feet were built on the wharf, and a pathway, 3 feet wide, of 3-inch pine deal, was placed on a length of 700 feet. The railing of the approach, 1,360 feet long, has been painted. The work was done by day labour, at a cost of \$6,009.12.

Total expenditure to 30th June, 1900, including dredging, is \$28,294.60.

## MATTAWA.

Mattawa is a post village in Nipissing, at the confluence of the Mattawa and Ottawa rivers.

This wharf was purchased from the Lake Temiscamingue Railway and Colonisation Company, in 1888, for \$1,200.

Slight repairs were made in 1894.

Total expenditure to 30th June 1900 is \$1,246.44.

## MEAFORD.

Meaford is an incorporated town in the county of Grey, and is situated on the west side of the Georgian Bay, 18 miles west of Collingwood, and 20 miles to the eastward of Owen Sound. It is the terminus of the Northern division of the Grand Trunk Railway. Population, 2,500.

*Construction.*—Prior to Confederation a pier 500 feet long, and having 14 feet of water at its outer end, was built by the local authorities, aided by a grant of \$6,000 from the government. This pier, which is on the west bank of the Big Head River, emptying into the harbour, was extended during 1874 and 1875 160 feet, and an arm 200 feet long was built in a northeasterly direction, in order to afford protection against north-east winds. A breakwater 410 feet long was also built on the east side of the river. The cost of these works was \$22,899.29, of which three-fifths was paid by the government and two-fifths by the municipality of St. Vincent. In 1878 the sum of \$250 was expended in dredging; and in 1880 and 1881 \$2,564.94 was spent by the department in dredging to 12 feet inside the western pier, deepening the channel to the inner harbour and dredging a portion of it to 11 feet. In 1884 and 1886 further dredging was done, and in 1887-8 the town contributed \$3,000 and the government \$5,000 to complete the dredging in the inner harbour to 13 feet, and to dredge a 100-foot channel, 14 feet deep, to it from the outside. In August 1889, a contract was entered into for the construction of the following works:—

1. Cribwork, 80 feet in length and 20 feet in width, at the north end of the eastern breakwater.
2. Cribwork, 160 feet in length and 20 feet in width, at the south end of the eastern breakwater.
3. Sheet-piling, 200 feet long, at the east side of the entrance to the inner harbour. This work was satisfactorily completed in May 1890, at a cost of \$4,987.84, and a space between the breakwater and the shore was also filled with stone. A portion of the harbour was also dredged to 12 and 13 feet in 1895 and 1896.

*Repairs.*—In 1882 a contract was entered into with Mr. Robert Reed for repairing the inshore portion of the west pier, which consisted principally in sheet-piling about 850 feet of the old cribwork. This was completed in 1883 at a cost of \$12,612.23. In 1892 and 1893 an expenditure of \$5,492.42 was made in repairing and rebuilding about 560 feet in length of pile protection work.

*Description.*—The harbour may be subdivided into two distinct portions, the inner and outer harbour. The inner harbour, which is established in the Big Head River, is about 800 feet long and from 150 to 260 feet wide, having a total area of about 4 acres. The depth of water varies from 4 to 11 feet at low water. The west side is formed and protected by a line of pile work, 1,170 feet in length, starting from the highway bridge across the river, and adjoining the west pier at a point 250 feet distant from its shore end. The east side is not protected by pile work, excepting at the entrance to the inner basin, where there are about 200 feet of piling built in connection with fish houses. The outside harbour is formed by two cribwork jetties, one on each side of the river, about 500 feet apart at their shore ends, with an entrance from the lake 170 feet wide. The east jetty 635 feet long and 20 feet wide. The west jetty is 600 feet long with an extension to the east toward the east jetty 220 feet long, making a total length of 820 feet. Its width is from 25 to 28 feet. There is a lighthouse at the end of the extension. The head of the jetty is in 12 feet of water.

On April 20, 1898, a contract was let to Mr. James Sparling, of Meaford, to construct a pile protection work on the west side of the harbour, a length of 340 feet, for the sum of \$2,761.18. Work was commenced on July 22, and completed on October 4 1899. The government dredge "Challenge" worked in the harbour at this place, and, besides deepening the same deposited some of the dredge material behind the pile work, the amount expended in dredging being \$2,597.47.



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The total expenditure in connection with this harbour is \$73,919.80 (out of which \$10,000 was contributed by the municipality of St. Vincent), which may be subdivided as follows :—

Construction .....	\$34,119	56
Repairs and building .....	18,104	68
Dredging .....	21,695	56
Total .....	\$73,919	80

## MIDLAND.

Midland, Simcoe County is the terminus of the Midland Division of the Grand Trunk Railway, on the Georgian Bay, population about 3,500.

Large quantities of lumber are shipped to and from this harbour, and the railway company has two large grain elevators at this place. During the past year the Canada Iron & Furnace Company has erected large smelting works.

In 1887-88 the department constructed pile protection work on the south west side of the harbour, a length of 950 feet, and in 1889-90 extended the same northwards 2,000 feet, making a total length of 2,950 feet, at a cost of \$57,582.94.

Dredging has been done at this place during 1892-3 at a cost of \$9,999.96.

During the past fiscal year dredging was done in order to accommodate the large class of vessels connected with the iron trade, and up to the 30th. June \$4,724.00 was expended on this account.

Total expenditure in connection with this harbour to end of fiscal year :—

Construction.....	\$57,582	94
Dredging.....	14,723	96
Total.....	\$72,306	90

## MORPETH.

Morpeth is situated in West Elgin, on Lake Erie, about 10 miles from Rondeau.

In 1884 work was commenced on a pier to be 500 feet in length and to have 12 feet at low water at its outer end. This work was completed in 1885.

Slight repairs have since been made such as in 1896 when about \$338.00 was expended.

Total expenditure to 30th June, 1900.—\$20,486.10.

This pier was transferred to control of Department of Marine & Fisheries 11th March, 1895.

## NEWCASTLE.

Newcastle is situated in the county of Durham on the north side of Lake Ontario, 47 miles east from Toronto. Population about 1,000. It contains large woollen mills, a tannery and implement factory.

This harbour was constructed by the municipality and is owned by a harbour trust. It is formed by a pier on the east side 900 feet in length, and a break-water on the west side of the entrance, 600 feet in length, and the above portion on the west side by pile revetment work 730 feet long.

In 1877 the local harbour trust having expended a large sum of money on the structures on the western side, and dredge the harbour to a depth of 10 feet, they were granted the sum of \$5,000 by parliament.

In 1883-5 the piers were repaired by this department at a cost of \$17,928.51. Dredging has been performed during the past few years giving a depth of 11 feet of water.

During the fiscal year 1899 repairs were made to the shore end of the east pier renewing same with plank and stringers at a cost of \$941.05. In performing the work some 33,000 feet board measure lumber and 450 pounds of iron were used.

The total expenditure at this harbour up to date is \$24,621.83.

#### NORTH BAY.

North Bay, a town in the county of Nipissing, and district of Algoma, is situated at the upper or west end of Lake Nipissing. It is the terminus of the Grand Trunk Railway at this point connecting with the Canadian Pacific Railway, 227 miles north of Toronto. The town is of considerable importance and is growing very fast. Population about 2,000.

On November 18th, 1898, a contract was let to Messrs. Lindsay & Burdett, of Collingwood, to construct a wharf at this place, for the sum of \$16,387, consisting of an approach of 780 feet of trestle work 25 feet wide, and 500 feet of cribwork, of the same width, with continuous superstructure on top.

Work was commenced on the 3rd January and completed on the 25th November, 1899. There was a delay of nearly three months in finishing the work owing to the high water submerging the cribs so that they could not be worked upon.

Owing to scouring on the outer face of the cribwork, it settled, and in May and June, last, brush and stone was placed in position in order to prevent further sinking, and, so far, it has had the desired effect.

Total expenditure to end of fiscal year :—

Construction .....	\$16,387.00
Stone and brush protection work.....	499.87
Inspection and superintendence.....	414.65
	<hr/>
	\$17,301.52

#### OAKVILLE.

Oakville is situated on the north shore of Lake Ontario, in the county of Halton, 22 miles west of Toronto. Population about 2,000. It contains several mills and factories and a ship-yard. The trade of the place is local. It is a station of the Hamilton branch of the Grand Trunk Railway.

The work of forming a harbour at this place was commenced in 1829 and at the date of the union of the provinces in 1841 the amount expended upon the two piers was \$14,361.08. The east pier was built 640 feet and the west pier 500 feet out into the lake; revetment work inside 422 feet in length.

The eastern pier having become decayed and wrecked it was found necessary to rebuild the outer end, a length of 360 feet, and the old portion of the pier connected with the new. This work was done by the department in 1887-8 and in 1888-9 the western pier was rebuilt from low water level.

The harbour is formed from the piers extending from the shore into the lake and by a dredge area and the creek.

During the fiscal year 1899 extensive repairs were started to the east pier, the shore end of which for nearly 200 feet was carried away by storms and a portion of the west and east piers having settled have to be levelled up, in some places, over 2 feet. About 225,000 feet board measure of lumber and 8,710 pounds of iron have been purchased for the repairs. The expenditure on above was \$4,465.94.

During 1888-9 extensive repairs were started to the east pier, the shore end of which for nearly 200 feet was carried away by storms and a portion having settled had to be levelled up, in some places, over 2 feet. The whole of the work on the east pier was completed in January last.

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The amount expended during the fiscal year ending June 30th last was as follows :—

Repairs.....	\$3,825 49
Dredging.....	674 10

Total..... \$4,499 59

Total expenditure in this harbour to date, \$47,605.14.

## OSHAWA.

Oshawa is an incorporated village in Ontario County, situated 4 miles inland from the shore of Lake Ontario on Warren's Creek and a station on G.T.R. 33½ miles east of Toronto. It is an important market town and has a number of manufacturing establishments.

It is also a port of entry. Population 4,000.

In 1895 the Government granted \$5,000.00 towards enlarging the pier which had been built by the municipality and for dredging the harbour.

At the same time the Harbour Trust expended \$9,968.00 for the same purpose.

The landing now consists of a pier extending out from the shore about 700 ft. into the lake in a south-west direction.

The pier offers no protection during stormy weather and owing to shallow water only very small vessels can land cargoes.

A safe artificial harbour could be made at a cost of about \$50,000.00.

It is intended to expend \$12,000.00 in repairing this pier next year.

## OWEN SOUND.

Owen Sound, in the county of Grey, is situated at the mouth of the Sydenham River which flows into the head of Owen Sound, an arm of the Georgian Bay. The town is the centre of an extensive agricultural district, and is the terminus of the Grand Trunk Railway Branch of the Georgian Bay and Lake Erie division, also of the Canadian Pacific Railway, Toronto, Grey and Bruce division. There are several lines of steamers running to and from Owen Sound. Population, 6,500.

*Construction.*—Prior to Confederation the harbour was formed by the municipality of Owen Sound, and in 1856 and 1866 grants were made by the government to assist in improving the channel of the Sydenham River, from its mouth up to the town of Owen Sound. These grants amounted to \$1,300. In 1874 a survey of the river was made, with a view of improving the channel, and in 1874-5 the sum of \$10,367.55 was expended by the department in making a generally straight channel, 150 feet wide, from the wharf at the foot of Peel Street to the outer light, a distance of three quarters of a mile. The depth of water obtained was 10 feet at low water. In 1876-7 a channel was dredged from the dry dock to a short distance outside of the outer light, a length of about 2,000 feet. The channel was about 150 feet wide and had a depth of 12 feet. Cost, \$6,589.77. In 1879 a further sum of \$1,951.30 was spent in dredging a narrow channel 65 feet wide to a depth of 14 feet.

The growing trade of the place demanding greater harbour accommodation, and the increased size of the steamers navigating the lakes requiring a greater depth of water in the harbours, it was decided to make considerable improvements in the harbour, and the town of Owen Sound agreed to contribute \$13,000 towards the cost. These works consisted in the building of two parallel rows of pile work, 200 feet apart, extending from the shore a distance of 600 feet, together with about 1,000 feet of bank protection, and the dredging of the channel of the river Sydenham, from the upper end of the steamboat wharf to its mouth, thence to 14 feet at low water, a distance of 5,000 feet.

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The expenditure in connection with this pile protection work was, in 1881-2, \$29,942.57.

In 1882-3 the pile work on each side of the entrance was strengthened by the placing of brush and stone, and a length of 3,000 feet of the channel, from a point below the outer light to the southern end of the pile work, at the entrance, was dredged to a depth of 16 feet. The dredging was continued in 1883 at a cost of \$6,583.05, but in March 1884, owing to the shifting nature of the bottom, soundings showed an average depth of only 14 feet over the channel opened.

In 1884-5 a depth of 16 feet was obtained at a cost of \$9,596.60. The foundations of the inner lighthouse were also protected with large stones at an expenditure of \$237.50. Dredging was continued from year to year at a large expenditure, in the inner harbour, and on a new channel approach to the harbour. The material taken from the bed of Owen Sound harbour, both in the river and at the approach, is a fine alluvium earth and still finer sand. The material runs into the cuttings made by dredging and continues to do so until the sides of the cuttings form a natural slope. This accounts for the large amount of dredging done at this place, and the comparatively small results.

In 1890-1-2 a large amount of protection pile work was done in the river. In 1894 a contract was entered into with Messrs. Porter & Canan, of Wiarton, for the construction of sheet pile revetment work in front of the esplanade, on the west side of the harbour, a distance of 1,550 feet. This work was completed at the end of 1895. In 1896 Messrs. Canan, Sadler & Co.'s plant was engaged dredging the harbour to 19½ feet depth at low water where most required.

During the past two seasons the largest vessels sailing the lakes have been able to use the harbour of Owen Sound. Protection work on the west side of the entrance channel is required to prevent the filling in of material brought down by the Pottawatamie river, and plans and specifications have been prepared and tenders asked for this work.

Dredging was continued in the harbour and entrance during 1898-9, and up to May, 1900. The expenditure during the past fiscal year on this account was \$11,000.00.

The total expenditure made by this Department in connection with this harbour is \$279,094.99, and may be subdivided as follows:—

Construction and reconstruction.....	\$123,377 27
Dredging.....	155,717 72
Total.....	\$279,094 99

This harbour was transferred to the control of the Department of Marine & Fisheries 18th November, 1882.

#### PICKERING HARBOUR.

The harbour of Pickering, formerly known as Frenchmen's Bay is situated on Lake Ontario, twenty-one miles east of Toronto.

Two piers were built here some years ago by local authorities and in 1878 and 1879, the Department extended the western pier 60 feet, at a cost of \$4,999.00.

Total expenditure up to 1st May, 1900.—Pier.....	\$4,999 00
“ “ “ “ Dredging.....	4,928 89
	<u>\$ 9,927 89</u>

During the coming year it is intended to expend \$4,000.00 in repairing and dredging between these piers.

## PORT ALBERT.

Port Albert is situated at the mouth of Nine-Mile Creek, on the east shore of Lake Huron, 11 miles north of Goderich, in the county of Huron, township of Ashfield.

There is no railway communication with the place.

In 1874-5 a breakwater was built here and the northern pier extended, and in 1881-2 a considerable sum of money was expended in dredging and pile protection work, costing \$9,521.31.

In 1893 this department let a contract to Mr. Patrick Navin to extend the north and south pier a distance of 200 feet each by means of cribwork and continuous superstructure 20 feet wide, out into the lake for the sum of \$10,497.

In 1894, the contractor having failed to proceed with his work in a satisfactory manner, it was taken from him, and in 1894-5 the extension of the north pier was completed by day labour at a cost of \$5,689.93. Contractor was paid for the work performed, \$1,304.35, and also allowed for dredging, \$3,441.25.

During the year 1899, repairs were made to the north pier and the pile protection work, costing \$997.93. Some 33,766 feet, board measure, lumber, 16 cords stone and 1,670 lbs, iron were used in these repairs.

The population is small, being only a post village; and the trade is only in local farm produce and small quantities of lumber.

The harbour proper is formed by the two piers extending out into the lake, and pile protection work inside the mouth of the creek, to keep the banks from falling in.

The total expenditure in connection with this harbour up to date is \$28,797.13.

## PORT BRUCE.

On north shore of Lake Erie 100 miles above Port Colborne.

Harbour was constructed by Port Bruce Harbour Co., which in 1857-8 obtained a loan of \$6,000.00 from the Government.

There are two piers 115 feet apart and 700 and 750 feet long.

## PORT BURWELL.

Port Burwell lies on the north shore of Lake Erie, about 90 miles above Port Colborne.

This harbor was formed by a company, incorporated in 1832, which received a loan of £3,000 from the Government. In 1840, the works were surrendered to the government; and in 1860, the deed of surrender was annulled.

The only expenditure made by the Government after the union of the provinces, was \$546 for surveys.

A thorough survey was made in 1874, up to which time the company claimed that it had expended \$100,100 on the harbour.

In 1876-7 the sum of \$10,055.37 was expended in repairing the breakwater, and in dredging the harbour to a depth of 10 feet.

During the fiscal year 1899 extensive repairs and improvements were commenced in the harbour; old cribwork has been removed on a length of 100 feet and rebuilt 20 feet high and 24 feet wide; 300 feet of old sheet-piling has been removed and replaced by oak and maple pile, 25 to 35 feet long; and the deepening of the harbour was commenced.

During the past fiscal year pile protection work 1095 feet long has been constructed inside the harbor, to enclose, when dredged, an inner harbour or basin, between it and the pile wharfing on the east side.

Of this protection work and wharfing it will be necessary to place tongued and grooved sheet piling in front of the work already done, a distance of 580 feet

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on the west side and 445 feet on the east side, in order to prevent fine sand from running through into the harbour which would require constant dredging.

As the present piers do not reach out into the lake as far as the solid blue clay bottom, it is necessary to extend them past the shifting sand which can be accomplished by running the east pier out 200 feet and the west pier 300 feet. This would make permanent work and prevent the formation of sand bars and repeated periodical dredging.

The estimated cost would be about \$23,000.00.

It is also proposed to dredge to 18 feet in depth.

Total expenditure to 30th June, 1900 is \$97,100.00.

#### PORT COLBORNE.

On north shore of Lake Erie at upper entrance to Welland Canal.

Two piers 90 feet apart, west pier is 2,364 feet long.

These works are considered a part of the Welland Canal and are under control of the Department of Railways and Canals.

#### PORT DALHOUSIE.

On the south shore of Lake Ontario at mouth of Twelve Mile Creek. Two parallel piers are constructed 200 feet apart having a total length of 4,980 feet.

This harbour forms the lower entrance to Welland Canal.

These works are considered a part of the Welland Canal, and under control of the Department of Railways & Canals.

#### PORT DOVER.

On north shore of Lake Erie, 49 miles above Port Colborne.

In January, 1832 a company was incorporated to build a harbour; work to be completed in 1839. In 1835 time for completion was extended to 1842. In 1843 the work being incomplete, was transferred to the Government.

By order in council of 13th August, 1850, the harbour was sold for \$30,400.00 to the Port Dover Co. In 1863 it was resumed by the Government.

There are two piers 75 feet apart and about 1,000 feet in length.

#### PORT ELGIN.

Port Elgin is in the electoral division of the southern portion of the county of Bruce, on the eastern shore of Lake Huron, about 24 miles north of Kincardine, and 4 miles south of Southampton. It is a station of the Wellington, Grey and Bruce division of the Grand Trunk Railway. There is no track from the railway to the harbour. Population, 2,000.

A block of cribwork was placed about 1,500 feet out in the lake from the shore in 1857, and a small pier built for shipping purposes in 1857-58 by a local company, aided by a government grant of \$4,000. The total cost of the above was \$7,180.

In 1881-2 this department built a breakwater 600 feet in length in front of the landing pier, and in 1884-6, the breakwater was extended 950 feet in length, in a northerly direction, joining the shore at the northerly end so as to inclose a basin, or harbour, making a total length of 1,550 feet. The structure is formed of cribwork and continuous superstructure, above low water.

The harbour is formed by the breakwater extending from the mainland in a southerly direction. Shipments are made from the landing pier.

The trade of the place consists of bark, brick, flour, grain, fish, lumber and farm produce. The only manufactories are a brush and rake factory.

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During year 1899 Messrs. Bowman & Porter's plant dredged out the channel approach and a portion of the harbour, working 362 hours. The amount expended, including superintendence, was \$2,896.

The municipality has expended about \$16,000 in improving the harbour.

During the past fiscal year repairs have been executed to the landing pier, costing \$500.00, some 28,000 f.b.m. 3-inch plank, 7 kegs of spikes and 2 cords of stone were used.

On the 17th January last a contract was let to Mr. John Burns to construct an extension to the breakwater, consisting of cribwork, substructure and continuous superstructure 540 feet in length, and 15 feet wide, for the sum of \$5,240.00. Work was commenced in May last and very good progress had been made up to the 30th June. It is expected the work will all be completed in the time specified.

The total expenditure at this place up to date is \$21,152.37.

## - PORT FINDLAY.

Port Findlay is in the Algoma District on the north shore of Lake Huron, about 5 miles below the entrance to Ste. Marie River, and 30 miles south east of Sault Ste-Marie.

Up to the present time this place has had only a private landing, which was quite inadequate for the traffic. An appropriation was made by Parliament for the construction of a wharf, and a contract was let to Mr. Murdock MacLennan to construct a wharf of the following dimensions: stone and earth approach embankment 170 feet long, 20 feet wide on top, and close-faced fully ballasted cribwork substructure 135 feet long, 30 feet wide with superstructure on top.

The contract price is \$5,730.00.

Work was commenced on the 25th May last, and good progress has been made up to the end of June. The total amount expended upon the above contract for the past fiscal year is:—

Work performed.....	\$730.00
Inspection, &c.....	24.00
	<hr/>
	\$754.00

## PORT HOPE.

Port Hope is situated in the county of Durham, on the north shore of Lake Ontario, 63 miles east of Toronto, on the Grand Trunk Railway, and has a population of about 8,000. Chief trade is in lumber and grain.

The first harbour works were constructed by a company in 1832, afterwards vested in commissioners in 1853. In 1875-7 piers were extended and a considerable amount of dredging done. Additional dredging and extension of east pier was made in 1882-83.

During the fiscal year 1899 repairs were made to the southern end of the west pier and a sand fence 550 feet in length has been built on the west side of the west pier to prevent the sand from drifting over into the harbour. On the east pier, 100 feet of the old work has been entirely rebuilt up from the low water level and the shore end of this pier for some 300 feet in length has been renewed with stringers and planking. To make the above repairs, some 229,000 feet B. M. lumber and 1,500 pounds of iron were used, as well as eleven new mooring posts placed in the work. The cost of above for materials and labour was \$5,515.

During the past fiscal year repairs were made to the east pier, at the shore end, and 500 feet in length was rebuilt from low water, up at a cost of \$499.31 which is the amount expended during the fiscal year ending 30th June last.

Total expenditure at this place to date is \$156,670.18.

## PORT MAITLAND.

On north shore of Lake Erie at the mouth of Grand River connected by branch canal with feeder of Welland Canal.

Two piers 180 feet apart, 1,500 feet in length.

This harbour is considered as a part of the Welland Canal and is under control of Department of Railways and Canals.

## PORT ROWAN.

Port Rowan, Norfolk County, is on the north shore of Lake Erie, in the inner bay of Long Point, and is 21 miles from the town of Simcoe.

On the 5th of December, 1892, a contract was entered into with Mr. P. Navin to build a landing pier 1,060 feet in length at this place, the structure to consist of a shore approach 535 feet in length, built of stone and gravel, the remaining 525 feet to be of 12 cribs with spans between them covered over.

The work was commenced in March, 1893, and completed in June, 1894, at a cost of \$9,497.07.

In 1895 the pier was strengthened at a cost of \$1,143.16.

Total expenditure to 30th June, 1900 is \$12,059.86.

## PORTSMOUTH.

Portsmouth is situated on the north shore of Lake Ontario, county of Frontenac, on Portsmouth Bay, 2 miles from Kingston. Population, 1,700.

In 1882 dredging was done in the harbour, to give 13 feet of water, at a cost of \$3,300.00.

In September last, authority was given to expend \$2,000.00 in making repairs to the "Long Pier." Work was commenced and completed in April last, 161 feet in length of approach was rebuilt with stone and gravel, 460 feet of the pier was replanked and new stringers placed where required, 162 fender guards were placed in position and 12 toise of stone used.

The amount expended during the fiscal year ending 30th June last is \$2,000.00

Total amount expended at this place to date, \$5,300.00.

## PORT STANLEY.

Port Stanley is on the north shore of Lake Erie, at the mouth of Kettle Creek, in the county of Elgin, about 85 miles west from the entrance of the Welland Canal and 8 miles south from the city of St Thomas, and is the terminus of the Lake Erie and Detroit River Railway. The population is about 1,000.

In 1827 an Act was passed by the Parliament of Upper Canada, appointing commissioners to make a harbour, and appropriating £3,000 for this purpose; which sum was further supplemented by grants of £3,500 and £2,000. After the union of the provinces, very extensive repairs and improvements were made. The total sum expended up to confederation amounted to \$230,531.88. By an order in council, dated September 1, 1859, the harbour was transferred to the London and Port Stanley Railway Company on condition that the tolls collected should be applied to the maintenance of the works.

In 1870, when an extensive survey of the harbour was made, the works consisted of two lines of piers placed 86 feet apart at the outer and 82 feet apart at the inner end. The western pier was 1,456 feet in length with a width of 20 feet for 548 of the shore end and 30 feet wide for the remainder of its length. The eastern pier was 1,150 feet in length and 30 feet wide. From the inner side of the western pier a dock 11 1/2 feet in width was continued on the same line northward



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for 882 feet, in which there was a recess 90 feet long by 53 feet deep. This docking formed the west side of the harbour. From the inner end of the eastern pier a line of pile-docking formed the eastern side of the harbour. The inner basin was about 850 ft. long by an average width of 280 ft., containing nearly  $5\frac{1}{2}$  acres, a small portion of which had a depth of water from 7 to 11 feet but the greater part—over four acres—had only a depth of from 1 to 5 feet.

In 1876-7 an extension was built to the western pier 85 feet in length by 30 feet wide at a cost of \$8,158, and in 1882 the outer end of this pier, which had settled, was raised to its original height, at a cost of \$600, for the purpose of placing a lighthouse upon it.

The trade of the place chiefly is fish, cordwood and farm produce, and since the Lake Erie and Detroit River Railway have owned the line from Loudon, the Lake Ferry steamers now call and deliver coal on the cars at this place. There is a regular steamboat line between this port and Cleveland on the south side of Lake Erie.

The municipality has not expended any money on improving the harbour.

As a harbour of refuge this place is well situated, being half way between Long Point and Rondeau.

The harbour is formed by the two piers extending out into the lake and by an inner harbour dredged out at the mouth of the creek. It is well sheltered inside and the entrance is not difficult.

During the year 1899 the sum of \$8,105.93 was expended in repairs to the west pier, 770 feet in length, which was entirely renewed from low water level. In doing this work some 281.307 feet B.M. of lumber and 18,450 pounds of iron was used.

Dredging was also carried on in the harbour for the amount of \$1,940.38.

By order in council dated February 14, 1898, the sum of \$10,000 was granted to the Lake Erie and Detroit River Railway Company as assistance in carrying out extensive improvements in the harbour undertaken by the above named company.

The amount expended during the year being \$20,046.31.

On the 29th September last authority was given to expend the sum of \$13,000 to continue the repairs to the piers, with this amount the west pier, at the outer end, was rebuilt above low water a distance of 422 feet, and the east pier a distance of 774 feet from low water up. Repairs were also made to the west pier, damaged by the spring freshets. The amount expended in repairs during the last fiscal year were \$13,037.46.

The total amount expended on this harbour to date is \$311,845.82.

## RAINY RIVER.

The Rainy River, about 100 miles long, forms part of the boundary between the province of Ontario and the state of Minnesota, viz :— between Rainy Lake and Lake of the Woods. The river is in the north-western part of Ontario, viz :— in the District of Algoma, and its navigation is impeded by rapids; the principal obstruction being the Manitou and Long Sault Rapids.

During the fiscal year 1896-97, \$5,332.56 of the \$15,000, appropriated by Parliament, for the improvement of the Rainy River, at its second session of 1896 was applied in facilitating navigation past the Long Sault Rapids.

These rapids are situated about 40 miles above the outlet of Rainy River on Rainy Lake, and 120 miles east of Rat Portage.

Wing dams were built from both shores at the foot of the "Big Chute," and solid rock was removed by blasting from the bed of the river in the rapids.

On account of the delays experienced in the transportation of the tools required, and the construction, rigging and fitting up of scows and other plant necessary to remove the rock, the dams and excavation commenced in the latter

part of 1896 could not be completed before the spring of 1897; 1,500 cubic yards of granite had to be quarried to build the dams and about 1,000 cubic yards of that quantity were placed in the work.

A survey of the rapids had also to be made before the site of the dams could be located.

The removal of rock from the bed of the rapids progressed very slowly on account of the difficulties that were encountered in blasting them, the high stage of the water and the extreme cold weather that prevailed for nearly the whole winter.

When about half the rock excavation contemplated was completed, an unexpected early spring, with accompanying spring freshets, put an end to all further work for the season.

In 1898 the sum of \$5,286.29 was expended in construction and in 1899 \$554.00 for the same purpose.

Some improvements were made to wing dam and efforts were made in 1898 to remove rocks from the Long Sault Rapids but without much success.

It was considered advisable to improve these rapids during the winter months. To secure continuous navigation to Fort Francis, extensive dredging must be done at several points above the rapids.

Total expenditure to 30th June 1900, \$22,325.55.

#### RONDEAU.

Rondeau is situated in the county of Kent, at Point aux Pins, on the north shore of Lake Erie, about 140 miles west of Port Colborne, the Lake Erie entrance to the Welland Canal. It is a harbour of refuge and a very important one on this side of the lake. Of late years the beach at Rondeau has become a much frequented summer resort and many cottages have been erected here. The Erie and Huron Railway have constructed their line this far and are also establishing a dock for Lake Ferry to deliver coal in cars from the other side.

Point aux Pins projects out into the lake and incloses a natural basin of over 6,000 acres in extent. The communication between the basin and the lake is over a sand bank, some parts of which are above the level of the water. In 1884 a breakwater was built here by the government, and in 1851 the harbour was sold to the Rondeau Harbour Company for \$8,000, upon condition that the company would keep the work in an efficient state of preservation; but the stipulation being wholly neglected, possession was resumed by the government in July, 1856, when the works were repaired.

In 1869 it was found that all the works were in a ruinous condition; the rapid current had scoured out the channel between the piers and undermined them, causing them to fall inwards, while some 350 feet of the outer end of both piers had entirely disappeared.

In 1871 the piers were rebuilt, the channel and basin enlarged, and all necessary work done to form a harbour of refuge. The work consisted of two parallel piers 783 feet in length, 250 feet apart and 15 feet of water between them; a breakwater 225 feet in length and dredging an area of 10 acres in the inner basin to 15 feet deep.

In 1881-2 this department constructed 2,000 feet of pile protection work on the beach to the westward of the entrance. This work cost \$197,890.76.

During the year 1899 repairs have been made to the piers, costing \$3,499.93. Work was commenced in August, 1898, and finished in May 1899. Some 250 feet of the northern end of the west pier was rebuilt up from low water level, and considerable repairs made to other portions of the piers. In doing the above work, 63,748 f. b. m. of lumber and 6,787 lbs iron were used.

In August last, authority was given to continue the repairs to the western pier, and work was commenced in the same month and continued until June last.

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The sum of \$6,200 being expended completing the rebuilding of the superstructure of the west pier to within 25 feet of the outer end.

In September, orders were issued for the Chatham Dredging Company to dredge the channel and a basin inside the harbour to accommodate the "Lake Ferry", and the sum of \$3,989.75 was expended in removing 26,015 cubic yards of material.

The amounts expended during last fiscal year are as follows:—

Reconstruction on west pier.....	\$ 6,200 00
Dredging .....	3 989 75
Superintendence .....	94 25
	<hr/>
	\$10,284 00

The following is the expenditure at this place to date:—

Before Confederation.....	\$ 74,437 70
Since Confederation.....	237,682 88
	<hr/>
	\$312,120 58

This harbour was transferred to control of Department of Marine and Fisheries 17th December, 1888.

## SAUGEEN RIVER.

Saugeen River runs into Lake Huron 143 miles above Sarnia, passing through the village of Southampton, situated on the shore of this lake in the north riding of Bruce.

In 1858 the Government constructed a breakwater on the north side of the river. The local authorities repaired it in 1868, receiving a grant from the Government of \$3,500.00. The breakwater cost \$18,795.99.

The mouth of the river affords a harbour to small craft, such as tug steamers and fishing boats, and is extensively used for the purpose of packing and shipping fish.

During the past fiscal year the department has expended \$494.00, in removing 3,306 cubic yards of material off the bar at the entrance to the river.

The total amount expended at this place up to date is \$33,251.82.

## SAULT STE. MARIE.

Sault Ste. Marie in Algoma County is situated at the head of St. Mary River, which connects Lake Superior with Lake Huron.

A wharf built by private enterprise some years ago in front of the town for vessels to land passengers and discharge cargo accommodated all the wants of the place until 1883 when a larger class of vessels being used on the upper lake navigation it was considered necessary to provide deeper water, and in 1885 this department expended the sum of \$4,441.50 in dredging in front of the wharf. As the material dredged was composed of rock and boulders the progress was slow and results not equal to expenditure, and this department decided, 1887, to obviate the necessity of dredging by extending the wharf 150 feet out into the river, when a depth of from 14.6 to 18 feet could be obtained. The extension was made in 1887-8 at a cost of \$12,019.26

A further extension and enlargement of this wharf is much needed as the larger class of vessels cannot use the Canadian side and have to purchase their coal and provisions on the American side of the River.

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In July last urgent repairs were made to the wharf, costing \$349.43, and again in May last, further repairs had to be made, at a cost of \$522.82, being a total for the past fiscal year of \$872.25.

The total expenditure at this place may be subdivided as follows :—

Dredging .....	\$ 4,441.50
Construction .....	13,288.57
Repairs .....	1,189.04
	<hr/>
	\$18,919.11

## SOUTHAMPTON.

Southampton is in the electoral district of North Bruce, situated at the mouth of the Saugeen river, which empties into Lake Huron, 143 miles above Sarnia. It is the terminus of the Wellington, Grey and Bruce Division of the Grand Trunk Railway.

Chantry Island is situated about 1 $\frac{3}{4}$  miles west south-west from the mouth of the Saugeen river.

In 1856 the Government built a breakwater extending in a westerly direction from Chantry Island. This was repaired and extended in 1871-77. Total length 2260 feet.

A small landing pier and beacon was built at the same time. In 1858 the breakwater extending from the main shore in a north westerly direction, 2380 feet, was commenced.

The above structures cost \$267,380.76., and the total length of the breakwaters is 4,600 feet.

The harbour is formed by the breakwater extending from the mainland and a "Landing Pier", some 600 feet southward of this breakwater, 760 feet in length.

The "Roadstead" is formed by the breakwater, extending from Chantry Island towards the mainland. To the south of these breakwaters a refuge for shipping is found.

The trade of this place is chiefly fishing and lumber. The population is about 1,500.

Owing to the existence of a number of boulders, in the channel, vessels, drawing over 12 feet cannot, with safety, call at this place.

The harbour proper, that is the portion between the landing pier and the breakwater extending from the mainland is very much exposed to winds and sea, and, in order to make it safe, it would be necessary to extend the landing pier a distance of about 200 feet in a northerly direction, and a spur from the mainland breakwater towards the landing pier about 400 feet in length.

The municipality has not expended any money upon the harbour works at this place, but the Government has expended very large sums in building breakwaters and the landing pier, as well as for dredging out the large accumulations of sand which is carried into the harbour, washed from the sand banks along the shore to the south of the landing pier.

During the fiscal year ending 30th June, dredging was done between the landing pier and the shore breakwater, at a cost of \$1,997.00, and a "slideway" and some minor repairs were made to the east breakwater at an outlay of \$199.64. Total expenditure for the fiscal year past, \$2,196.64.

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The following is the expenditure at Southampton and Chantry Island —

Expended before Confederation.....	\$ 10,236 39
By Government to 30th June, 1882.....	8,559 60
" " " " 1884.....	1,607 58
" " " " 1885.....	10,132 98
" " " " 1886.....	1,191 45
" " " " 1888.....	1,477 50
" " " " 1889.....	1,853 50
" " " " 1890.....	3,014 32
" " " " 1891.....	5,966 20
" " " " 1892.....	2,500 00
" " " " 1893.....	5,700 00
" " " " 1900.....	2,196 64
Total.....	\$ 54,436 16

## CHANTRY ISLAND.

Expended before Confederation.....	\$ 31,913 95
By Government to 30th June, 1882.....	235,466 81
" " " " 1884.....	2,345 30
" " " " 1886.....	3,489 88
" " " " 1887.....	2,538 60
" " " " 1888.....	115 15
Total.....	\$ 275,869 69

## SUMMARY.

Southampton.....	54,436 16
Chantry Island.....	275,869 69
Total.....	\$ 330,305 85

These works were transferred to control of the Department of Marine & Fisheries 27th June, 1888.

## SUMMERSTOWN.

Summerstown, county of Glengarry, is on the north side of Lake St. Francis, 10 miles below Cornwall.

A wharf having a length of 130 feet and a width of 20 feet, with a short connection of 85 feet in length, was built in 1886-7. The wharf has a height of 11 feet at the outer side.

In the fall of 1888, a warehouse 24 by 30 feet was constructed.

Total expenditure to 30th June 1900 is \$15 448.41.

This wharf was transferred to control of Department of Marine and Fisheries on the 12th March 1890.

## THESSALON.

Thessalon is situated on the north side of the north channel (Lake Huron), in the district of Algoma.

On the 3rd April 1895, a contract was entered into with Messrs. Read & Green, of Owen Sound, for the construction of a landing pier of cribwork, at this place, with superstructure 325 feet in length and an approach of stone work 80 feet in length, making a total length of 405 feet. Active operations were com-

menced in July 1895, and the whole of the work was completed in October of the same year, and accepted by the department, the total expenditure being \$8,658 for work and inspection.

No expenditure has been incurred since its completion in 1897.

Work was transferred to control of Department of Marine and Fisheries in December 1895.

#### THORNBURY.

Thornbury, an incorporated village in Grey county, is situate at the mouth of the Beaver River, which empties into Georgian Bay; on the Meaford branch, of the Grand Trunk Railway, eight miles from Meaford and 19 miles from Collingwood. It contains four churches, twenty stores, two hotels, two grist, one saw, one woolen and one planing mill, two printing offices issuing weekly newspapers, and telegraph and express offices. Population 900.

Many years ago a pier was constructed at this place by the residents of the locality, but it was allowed to fall out of repair and become useless.

*Construction.*—During the session of 1881, the sum of \$7,000 was voted to construct a pier on the western outlet of the Beaver River, and to dredge a basin 100 feet in width to 10 feet depth on its eastern side. This grant was supplemented by the sum of \$7,000 furnished by the town of Thornbury, and the work was placed under contract. The pier was built of solid cribwork, for a length of 425 feet out from the shore into Georgian Bay; the outer portion or landing block is 145 feet in length and 35 feet in width, and the remaining portion of 280 feet comprising the approach is 18 feet in width. This work was completed during the year 1882-3, at a cost of \$14,136.37. In 1883-4-5, the sum of \$8,085.09 was expended in the construction of protection works on the eastern side of the basin. The work consisted in the construction of a close pile jetty extending 400 feet out from the beach into the lake, forming an artificial harbour. During the year 1886-7, a row of piling was driven from the inner end of the landing pier, in a south-westerly direction, for a distance of 280 feet on the western shore of the Beaver River, at a cost of \$1,818.48, to prevent the beach being cut through by the seas. In 1892-3, a sum of \$2,981.27 was expended in the construction of 150 feet in length of pile protection work, and in forming a slip in the landing pier. In 1897-8, it was decided to build a small breakwater in the harbour in order to shelter small craft. The breakwater is 190 feet long and 16 feet wide and was built at a cost of \$978.06.

*Dredging.*—The dredge *Challenge* in 1886, opened a channel in the shoal between the dock and the breakwater, removing 8,820 cubic yards of boulders, gravel and sand at a cost of \$1,185.55. During the year 1887-8-9 and 1891-2, some extensive dredging was done to improve the harbour and make it easier of access, at a cost of \$7,265.23.

*Repairs.*—In 1891-2, repairs were made to the approach of the landing pier. The work consisted in removing the wreck of 100 feet of old pile protection work, on the inside of the approach to the pier, building the same with new material and making up the embankment with gravel. The work was done by day labour at a cost of \$624.99. The landing pier, which was much in need of repair, was still further damaged in May, 1893, when an unprecedented rain-storm of two days duration caused a heavy flood in the Beaver River, carrying away all the mill-dams in the vicinity of Thornbury. The debris brought down by the stream and current undermined the shore end of the landing pier and the structure, for a distance of 160 feet out, sank and fell in towards the harbour. During the years 1893-4 and 1894-5, \$6,387.18 were expended to put the landing pier in a complete state of repair. In 1895-6 and 7, an expenditure of \$46.05 was made for slight repairs.

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During the year 1899 the sum of \$999.99 was expended in completing certain repairs on the pier and its approaches.

The total expenditure incurred on this harbour may be summarized as follows :—

Construction (including \$7,000 furnished by the town of Thornbury) . . . . .	\$27,999	27
Dredging . . . . .	8,450	78
Repairs . . . . .	8,058	21
Total . . . . .	\$44,508	26

TOLSMAN BAY (Cockburn Island).

Tolsman Bay is situated in Algoma County and on Manitoulin Island.

In 1889 a pier was constructed which is 375 feet long, consisting of an approach of stone 175 feet and cribwork 200 feet, is 27 feet in height with 20 feet of water at outer end, and is 20 feet in width.

Slight repairs were made in 1899.

Total expenditure to 30th June 1900 is \$8,381.36.

## TORONTO HARBOUR.

The harbour of Toronto is situated on the north shore of Lake Ontario, and is formed by a large circular bay about  $1\frac{1}{2}$  miles in diameter, separate from the lake by a low island (formerly a peninsula), about six miles long, making a safe and well sheltered harbour capable of containing a large number of vessels.

In 1788, the harbour was described to be nearly two miles in length, from the entrance on the west to the isthmus between it and a large morass to the eastward. The breadth of the entrance was about half a mile, but the navigable channel for vessels was only 1,500 feet, having a depth of from 18 to 21 feet of water. In 1832, Bouchette stated that the peninsula, now Toronto island, was a narrow slip of land, in several places not more than 180 feet in breadth, but widening towards its western extremity to nearly a mile. In 1833, changes in the state of the harbour were apparent, and the necessity for its preservation engaged the attention of those interested; no action, however, was taken at the time. In 1850, the harbour was put in commission, and early in 1852, it was reported that from observations made and soundings taken during twenty years, it was ascertained that the navigable channel had narrowed down to about 200 feet. In 1853, an opening was made during a storm through the narrow beach at the eastern end of the harbour, which closed again in a short time afterward, although attempts were made to give permanence to the beach, the whole was swept away and the eastern entrance was formed.

In 1859, the harbour master reported a depth of eight feet of water in the eastern channel. In 1860, the western channel was dredged to a width of 400 feet, and an average depth of 12 feet. In 1862, the eastern entrance had increased to half a mile in width, and a bar had formed which had shoaled the water. Between 1874 and 1880, the sum of \$49,120.90 had been expended principally in increasing the width and depth of the western entrance, and a certain amount of blasting for the removal of solid rock was executed.

In 1881, an examination of the harbour was made by Mr. Jas. B. Eads, C.E., who submitted a carefully prepared report, in which he advised the closing of the eastern entrance, to obtain and maintain a depth of 18 feet at low water. Before any action could be taken on these suggestions, the marshes bounding the eastern side of the harbour, and the whole of the southern shore of the island were damaged to such an extent as to necessitate a complete departure from the plans prepared by Mr. Eads. As attention had to be paid to the protection of the eastern

side of the harbour, and the preservation of the eastern portion of the island, where it was the narrowest, and through which several breaches had been made, in 1882, work for the protection of the harbour, extending from the Don southwardly to Fisherman's Island, and for the protection of the island, over a length of 6,500 feet, was commenced, and was brought to completion in 1885.

In 1889, a contract was entered into for improving the eastern entrance and the continuation and completion of the harbour protection. These works consisted in building 1,650 feet of cribwork to partially close the eastern gap from Fisherman's Island up to the new eastern channel; in protecting and maintaining the channel by the construction of two rows of cribwork, respectively 2,420 feet and 2,280 feet in length, 400 feet apart, and by dredging between these two rows of cribwork to a depth of 16 feet at low water. It was also decided to rip-rap with heavy stone the breakwater at the island, this last work being done by day labour, under direct charge of the department. All the above mentioned works, outside of the dredging, was practically completed in 1896 only.

During the winter of 1896-97, severe storms caused the settlement of the north and south ends of both west and east piers. The north end of the west pier having settled below lake level, it was found necessary to take down and rebuild some 120 feet of the superstructure, and to place brush mattresses and large stones around the end and channel face to protect it from further scouring. This was also done to the north and south ends of the east pier. Settlement having also taken place along the channel side, an extra course of timber was put on and the waling taken off and replaced to proper level. During the year 1897-98, the north end of the east pier having again settled considerably out of line, it was found necessary to take down 200 lineal feet of the superstructure and rebuild it, after the pier had settled back into place by excavating a seat for it with the city's pumping dredge. Brush mattresses, 32 feet in width, were sunk along the face of the pier on the channel side, for 210 feet in length to protect it from scouring, and no settlement of the pier was noticeable at the end of the year.

Repairs to the breakwater were also commenced and are now being carried out. A bar, formed during the winter of 1898, south of the west pier, contracting the channel to a little over 100 feet, was removed, and some shallow portions of the channel deepened. There is now a channel 190 feet in width, having a depth of 16 feet below zero of the gauge, from the end of the west pier outward. At the end of the year 1898 the dredge was employed in deepening the channel between the piers to 16 feet below zero. Three groynes composed of layers of brush mattresses and sunk with stones, were also constructed on the south shore of the island, west of the breakwork to protect the beach. These groynes withstood last winter's storms and made considerable land in their immediate neighbourhood, but they are too far apart to be of much service, as the sea did much havoc to the shore line lying between them, washing away a strip of beach, and uprooting several trees, besides doing damage to the sidewalk. They demonstrate clearly, however, the importance of others being put down closer together if the beach is to be retained. The sum expended on these works during the year 1898 is \$18,442.76.

During the fiscal year 1899, the dredging operations commenced in 1898, were continued in the eastern entrance in order to obtain a depth of 16 feet at low water. The amount expended was \$18,232.26.

When in 1881, James B. Eads, C. E. of St. Louis, Mo., was instructed, by the Hon. Minister of Public Work, to make a report on the preservation and improvement of Toronto Harbour. His report, which was presented to the Department in 1882, resulted in two contracts being awarded in January 1883: designated A and B. Contract A, covering the work along the west side of Ashbridges Bay, and also along the lake shore, westwardly, a distance of 2330 feet; and contract B, that on the south shore of the Island, from the breach in the peninsula, known as the Eastern Gap, westward, a distance of 6,500 feet.



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The works consist of a breakwater formed by two parallel rows of sheet piling, 10 feet apart, between, and on either side of which brush was deposited, and this in turn covered with rock ballast to the top of piling. The work was commenced in 1883, and completed in 1885.

It was found that the stone protecting the breakwater on the lake front, was of too light a character to withstand the heavy seas, and in 1887 it became necessary to further strengthen the piling by large blocks of stone to prevent the whole work being destroyed; being completed in 1892, by day labour, at a cost of \$89,083.70.

In 1888, plans and specifications were prepared by the department for the construction of works in the Eastern Gap, and the contract was awarded to Messrs Murray and Cleveland, of Ste. Catharines, 21st May, 1889.

The work consisted of two parallel piers extending from the Bay into the lake, having a distance between them of 500 feet; with a channel 300 feet in width, dredged in the center to a depth of 12 feet below zero of Harbour Commissioners' gauge at Queen's wharf. The east pier being 2420 feet in length; and the west pier 2550 feet, each pier being 20 feet in width, with counterforts on the lake side every 500 feet apart, and being further strengthened by piles driven along the face of the work every 10 feet apart. The east pier being connected with Fisherman island by a breakwater pier, 1,635 feet in length, and 15 feet in width.

The cribs forming the foundation of channel piers were to be sunk to a depth of 8' 6" below zero, a seat being previously dredged to that depth to receive them, and the cribs forming the breakwater pier to rest on the natural bed of the lake.

In order that the Eastern Gap might be made available for passage of vessels and small craft, as soon as possible after the signing of the contract, the contractors placed two dredges at work in May, and by November of that year they removed 135,654 cubic yards of sand; giving a channel 250 feet in width, having a depth of 12 feet below zero.

On 21st June, 1890 instructions were given to seat the channel cribs 16 feet below zero, in line of 8. 6 feet shown on original drawing, and also to sink the first three cribs forming the protection pier to Fisherman Island, the 1st at 16 feet, the second at 12 feet, and the third at 8 feet below zero, the remaining cribs of the protection pier to be on natural bed of the lake as at first intended.

The first crib was sunk in position on 7th August 1890, and during that season four cribs were placed, and 64,253 cubic yards of sand removed from the channel.

On the 6th October 1890, a severe gale from the eastward displaced one of the cribs, necessitating unloading it by divers and floating it back into position.

On 28th October the plans were again changed. The cribs to form the east pier, south of the protection pier to Fisherman Island were to be constructed 30 feet in width, in lieu of 20 feet, and the cribs forming the protection pier, 20 feet in place of 15 feet.

During the season of 1891, twenty-three cribs were sunk in position, and the superstructure constructed on the first six northerly channel cribs; and 123,735 cubic yards of sand removed from the channel.

A crib 100 x 20 x 8 feet in height was sunk at the west end of the breakwater to protect the shore line of the island to the west. The crib having settled after the winter storms additional courses of timber were added to it the following season, but the upper portion was carried away by the gales of 1893.

Further changes were made in the plans Feb. 26th 1892. The channel was to be made 400 feet wide, in lieu of 500 feet, and the west pier to be formed of 9 cribs, 20 feet in width; and one crib 30 feet in width at the south end.

During the season of 1892, 14 cribs were sunk in position, 2,005 lineal feet of superstructure built, 134,965 cubic yards of sand removed from the channel.

Further changes were made in the plans in December 1893. The first crib to form the west pier south of the breakwater, was to be made 20 feet in width,

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followed by 5 other cribs 30 feet in width, and 3 cribs 30 feet in width, to be placed at north end of the pier; also a crib was to be sunk at south end of east pier, 30 feet wide, which was subsequently changed to 40 feet.

During the season of 1893, 9 cribs were sunk in place, 851 lineal feet of superstructure completed, 135,596 cubic yards of sand removed from the channel.

During the season of 1894 large stones were deposited in angles of counterforts, 8 cribs were placed in position, 1,404 lineal feet of superstructure completed, and 73,290 cubic yards of sand removed from the channel.

During the season of 1895 the remaining 2 cribs were sunk. Brush mattresses were placed at end of east pier and large stones deposited around the end of the pier, 650 lineal feet of superstructure of west pier was completed; also the superstructure at south end of east pier, upon which a temporary lighthouse was erected; 54,932 feet B.M. of plank laid, and 18,140 cubic yards of sand removed from the channel and approaches up to August 14th 1895, when the dredge stopped work by order of Chief Engineer. Making a total of 685,633 cubic yards of sand dredged by Murray and Cleveland, from the commencement of their contract up to that date.

The north end of the west pier having settled the superstructure was rebuilt to grade in 1896, and brush mattresses sunk at the end of pier and along channel side for 70 feet in length, upon which large stones were placed. The superstructure at south end of the pier was also constructed.

Brush mattresses were sunk at south end of east pier, and large stones placed around end of pier. Some repairs were also done to the superstructure. No dredging was done during season of 1896. On 31st August, 1896 the works in the eastern gap were completed according to last revised plan.

A survey of the whole island was commenced, November, 1896. Soundings were taken in the Bay on the ice during the winter months, and plan prepared.

During the season of 1897, further repairs were done to talus along the breakwater on south shore of the island. The north end of the east pier having settled was rebuilt to grade by day labor. Brush mattresses were sunk along the face of the pier on channel side for 210 feet to prevent further settling of pier.

The sand having washed into the channel at the south end of the west pier it was found necessary to do further dredging there to enable heavily laden vessels to pass through, and Mr. W. E. Phin, of Brantford, was appointed to do this work. His dredge commenced work 29th July, and during the season removed 37,214 cubic yards of sand.

3 groynes, 94 feet in length, were placed on the south shore of the island to prevent erosion of the beach.

During the season of 1898 further repairs were made to the talus along the breakwater. 3 additional groynes were placed on south shore of the island. 67,043 cubic yards of sand were removed from the channel.

A self acting instrument for recording the lake fluctuations, known as the "Denison hydrograph," was placed in the signal house at the Queen's wharf, Toronto, and is under the care of the Deputy harbour master.

At the eastern channel, Toronto, 17,716 cubic yards of sand were removed during the 6 months ending 30th June, making a total dredge up to that date, since Mr. Phin's dredge commenced work, of 122,973 cubic yards.

Plans, specification and estimates were prepared for the extension of the west pier 800 feet, and for the necessary repairs to the superstructure at south end of the pier. Borings were made over site of proposed extension.

Plans, specification and estimate were prepared for the closing of the Don channel, and diversion of the river into Ashbridges Bay Marsh.

Plan and estimate were prepared showing the area to be dredged in the harbour to 16 feet below zero of city gauge at the mouth of the Don River.

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During the past year 87,454 cubic yards of sand were removed from the channel and at bar south of the east pier.

Total expenditure to 30th June, 1900 \$1,154,486.13.

## WHITBY.

Formerly Windsor, on north shore of Lake Ontario, 135 miles above Kingston. Commenced in 1843 and completed in 1846. Harbour vested in Board of Works by Act of Parliament in 1846 and by Order in Council Aug. 13th, 1850, and was sold to Port Whitby & Lake Scugog, Simcoe & Huron Road Co. for \$80,400; the company defaulting, harbour was resumed by Government 19th May, 1863, and in March, 1864, was sold to Port Whitby Harbour Co. for \$35,150, and road sold to another company for \$10,000.

The breakwater is 3,042 feet long, both ends touching shore with an opening 250 feet wide near eastern end. Two protective piers at entrance: one 620 feet long, the other 394 feet.

Inside of eastern portion there is 1,250 feet of pier work 20 feet wide.

Some dredging was done in 1897-8, and about 26,000 cubic yards of sand, clay and mud removed.

## WILSON'S ROCK.

Wilson's Rock is situated in Georgian Bay, about 35 miles from Sault Ste. Marie and 8 miles below Nabish Rapids.

In 1885 a block of cribwork, with a beacon thereon, was placed on this rock. No expenditure has been incurred since.

## PROVINCE OF MANITOBA.

*Wharfs on Lake Winnipeg.*

## GIMLI.

In 1897, Parliament revoked the sum of \$8,500.00 which had been appropriated at its second session of 1896 for the construction of wharfs on Lake Winnipeg; but no expenditure was incurred for this purpose, during the year ended 30th June, 1898.

In this connection it may be stated that a project has been submitted for the construction of a public wharf, 600 feet long, at Gimli, on the west shore of Lake Winnipeg, that would reach eight feet depth at mean low water. The proposed structure is to consist of an outer portion of solid cribwork, 20 feet wide and 400 feet long, and a stone approach from the shore 200 feet long; the top of planking to stand 4 feet above mean low water level.

Gimli is the most important Icelandic settlement on the west shore of Lake Winnipeg and is 62 miles north of the City of Winnipeg.

The object of building this wharf would be chiefly to afford to the inhabitants of the municipalities of Gimli, Woodlands and Rockwood, proper facilities for carrying on the lumber trade and the fishing industry. In summer, communication can only be had by water with these localities from Winnipeg, as the colonisation road is still almost impassable on account of its unfinished state and the swampy nature of the country traversed.

The work of constructing the Gimli wharf began in the month of January, 1900 although the bulk of the material such as stone, timber, &c., were either delivered at the site of the work, or at the nearest point of shipment.

The 100 feet of embankment approach to the trestle work has been completed in a first class manner, so also has the 150 feet of trestle work. The 270 feet of cribwork were sunk during the spring months, great care being taken to keep them clear and free from ice, and were pretty well up to grade when the fierce north-east gales which prevail at this point, caused an excessive settlement. The cribwork was surfaced and releveled twice, until it appeared that the continued settlement prohibited the continuation of the work in a workmanlike manner. The completion was thus deferred until such a time as no more settlement is observable.

No final settlement has been made with the contractor who virtually abandoned the work with the request that the Department complete it.

Total expenditure to 30th June 1900, \$9 000.55.

#### HNAUSA WHARF—LAKE WINNIPEG.

Hnausa is an Icelandic settlement situated on the west shore of Lake Winnipeg, Manitoba, about 52 miles north of West Selkirk and 70 miles north of Winnipeg.

In view of the increasing settlement and trade along the west shore of Lake Winnipeg, a wharf was constructed at Hnausa.

The work was under contract with Mr. Peter McVeigh, of Ottawa, at a price \$5,870.00; work began in June, 1895.

The wharf consists of 300 feet of open faced cribwork, 20 feet wide, with stone, and 60 feet of earth and stone approach.

The contractor failed to complete the work within the specified time (October 15th, 1895), and it was taken out of his hands and completed by Government labour in February, 1896.

\$167.60 was expended in 1897-98 in completing the work. Total expenditure to 30th June 1900, \$6,718.93.

#### ST. ANDREW'S RAPIDS (REMOVING BOULDERS).

The work of removing boulders from the channel in St. Andrew's Rapids was commenced on the 18th of January 1900.

The part known as Quarry Rapids, a place that was shallow and strewn with boulders, and always a troublesome place for navigation, was cleared for a length of 1,500 feet.

The method adopted was necessarily slow but thorough. Two teams with special tongs, were placed upon runners, and as the ice was cut open the boulders were drawn up to the boulders. When the boulders were small enough, they were lifted bodily out of the water on to the ice and drawn well up on to the bank by teams. When too large for the derricks to handle, the boulders were blasted and then lifted out.

The boulders, in this part of the river, were mostly hard granite and limestone slabs, the bed of the river being gravel and limestone. The work of clearing was carried on until the ice broke away in April, and the work had to stop. The minimum depth of the channel, in the part cleared, was 4 feet in low water.

As to the cost of the above work, some of the accounts require adjustment, though the total cost will aggregate about \$5,000.

#### FAIRFORD RIVER.

The work of excavating the Fairford River, to regulate the flow of Lake Manitoba, was started in July 1899.

The contractor built a special dredging plant to do the work, but on the completion of the plant, it was found that the dredge drew too much water to enable it to

Boat with the contemplated prism of the canal. The work was suspended until the spring of 1900 when, in the month of April, the contractor resumed work with a plant, which consisted of horses, scrapers, plows etc. The work has proceeded satisfactorily. The material removed consists almost wholly of gravel, with few boulders.

The total amount of expenditure to the end of the fiscal year, aggregated \$75,000.

## BRITISH COLUMBIA.

### COLUMBIA RIVER.

The headwaters of the Columbia River are a series of small lakes lying between the Rocky Mountains and the Selkirk Range, a little south of the 50th parallel north latitude. The upper lake is separated from the Kootenay River, by its rise in the heart of the Rocky Mountains, but a few miles north of the parallel—by a low sand and gravel divide, 2,700 feet above sea level, and a half mile. The Kootenay at this point, at an ordinary stage of water, is about 9 feet or so above the level of the Upper Columbia Lake. While the Kootenay flows in a south-easterly course to the boundary line, the water of the Columbia takes an entirely opposite direction towards the Canadian Pacific Railway at Golden, about 130 miles north-west of Canal Flat.

This portion has been known as the 'Columbia River above Golden' and is now open now for steamers of light draught as long as the river is free of ice.

At Golden the Columbia follows on—about the same course—the line of the railway on the south side, to Donald, where it crosses to the north side of the river and continues to follow it down to Beaver. Steamers can, it is believed, run from Golden to Donald, but not to Beaver. Leaving the railway at the latter place the river continues the same course to the Big Bend; here it doubles and takes a southerly course to Revelstoke, where it again meets the Canadian Pacific Railway. The distance from Beaver round the Big Bend is about 174½ miles.

About 30 miles below Revelstoke the river debouches into Upper Arrow Lake over a fan-like bar of moving sand. After passing through the lake—about 4½ miles long—the river is entered again; thence it continues to flow about 10 miles down to the Lower Arrow Lake; and extend southward about 10 miles more or less past this lake. The river between the lakes is called 'The Narrows.' Both of these lakes hardly exceed 4 miles in width in the widest places. From the Lower Arrow Lake to Kootenay Rapids—21 miles—the river is about 100 feet wide, with no very acute bends, but a strong current. This portion is known as the 'Columbia River below Revelstoke.'

Continuing through the rapids, passing the mouth of the Kootenay River on the left, the Columbia continues a wide and swift river, with many sharp bends and in one or two places by rock islands, to the international boundary below Sheppard, a distance of 32 miles from the head of the rapids. The general course is due south. This part of the river is known as the 'Columbia River below Kootenay.'

The valley of the river from the 'Big Bend' south lies between two ranges of mountains, the Selkirks to the left and the Gold Range to the right. The mountains lose to a great extent their rugged appearance as the lakes are reached. The banks and bed of the river are generally gravel and sand, thickly covered, with occasional rock bluff intervening.

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The 100 feet of embankment approach to the trestle work has been completed in a first class manner, so also has the 150 feet of trestle work. The 350 feet of cribwork were sunk during the spring months, great care being taken to keep them clear and free from ice, and were pretty well up to grade line, when the fierce north-east gales which prevail at this point, caused an extraordinary settlement. The cribwork was surfaced and releveled twice, until it was found that the continued settlement prohibited the continuation of the work in a good workmanlike manner. The completion was thus deferred until such a time as no more settlement is observable.

No final settlement has been made with the contractor who virtually abandoned the work with the request that the Department complete it—

Total expenditure to 30th June 1900, \$9 000.55.

#### HNAUSA WHARF—LAKE WINNIPEG.

Hnausa is an Icelandic settlement situated on the west shore of Lake Winnipeg, Manitoba, about 52 miles north of West Selkirk and 70 miles north of Winnipeg.

In view of the increasing settlement and trade along the west shore of Lake Winnipeg, a wharf was constructed at Hnausa.

The work was under contract with Mr. Peter McVeigh, of Ottawa, contract price \$5,870.00; work began in June, 1895.

The wharf consists of 300 feet of open faced cribwork, 20 feet wide, filled with stone, and 60 feet of earth and stone approach.

The contractor failed to complete the work within the specified time (October 15th, 1895), and it was taken out of his hands and completed by day labour in February, 1896.

\$167.60 was expended in 1897-98 in completing the work. Total expenditure to 30th June 1900, \$6,718.93.

#### ST. ANDREW'S RAPIDS (REMOVING BOULDERS).

The work of removing boulders from the channel in St. Andrew's Rapids, was commenced on the 18th of January 1900.

The part known as Quarry Rapids, a place that was shallow and thickly strewn with boulders, and always a troublesome place for navigation, was cleared for a length of 1,500 feet.

The method adopted was necessarily slow but thorough. Two derricks, with special tongs, were placed upon runners, and as the ice was cut open were drawn up to the boulders. When the boulders were small enough, they were lifted bodily out of the water on to the ice and drawn well up on to the banks by teams. When too large for the derricks to handle, the boulders were blasted and then lifted out.

The boulders, in this part of the river, were mostly hard granit and limestone slabs, the bed of the river being gravel and limestone. The work of clearing was carried on until the ice broke away in April, and the work had to stop. The minimum depth of the channel, in the part cleared, was 4 feet 2 in. at low water.

As to the cost of the above work, some of the accounts require adjustment, though the total cost will aggregate about \$5,000.

#### FAIRFORD RIVER.

The work of excavating the Fairford River, to regulate the flow of Lake Manitoba, was started in July 1899.

The contractor built a special dredging plant to do the work, but on trying the plant, it was found that the dredge drew too much water to enable her to



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float within the contemplated prism of the canal. The work was suspended until the spring of 1900, when, in the month of April, the contractor resumed work with a new plant, which consisted of horses, scrapers, plows etc. The work has since prospered satisfactorily. The material removed consists almost wholly of gravelly clay with few boulders.

The total amount of expenditure to the end of the fiscal year, aggregated \$7,647.84.

## BRITISH COLUMBIA.

## COLUMBIA RIVER.

The headwaters of the Columbia River are a series of small lakes lying between the Rocky Mountains and the Selkirk Range, a little south of the 50th parallel of north latitude. The upper lake is separated from the Kootenay River, which takes its rise in the heart of the Rocky Mountains, but a few miles north of the 51st parallel—by a low sand and gravel divide, 2,700 feet above sea level, a mile and a half wide. The Kootenay at this point, at an ordinary stage of water, is about 9 feet or so above the level of the Upper Columbia Lake. While the Kootenay flows in a south-easterly course to the boundary line, the water of the Columbia takes an entirely opposite direction towards the Canadian Pacific Railway at Golden, about 130 miles north-west of Canal Flat.

This portion has been known as the 'Columbia River above Golden' and is navigable now for steamers of light draught as long as the river is free of ice.

From Golden the Columbia follows on—about the same course—the line of the railway on the south side, to Donald, where it crosses to the north side of the railway and continues to follow it down to Beaver. Steamers can, it is believed run down from Golden to Donald, but not to Beaver. Leaving the railway at the latter place the river continues the same course to the Big Bend; here it doubles and takes a southerly course to Revelstoke, where it again meets the Canadian Pacific Railway. The distance from Beaver round the Big Bend is about 174¼ miles.

About 30 miles below Revelstoke the river debouches into Upper Arrow Lake, over a fan-like bar of moving sand. After passing through the lake—which is about 43 miles long—the river is entered again; thence it continues to flow for about 18 miles down to the Lower Arrow Lake; and extend southward 48 miles, more or less past this lake. The river between the lakes is called 'The Narrows.' Both of these lakes hardly exceed 4 miles in width in the widest part. From the Lower Arrow Lake to Kootenay Rapids—21 miles—the river is deep and wide, with no very acute bends, but a strong current. This portion is known as the 'Columbia River below Revelstoke.'

Continuing through the rapids, passing the mouth of the Kootenay River on the left, the Columbia continues a wide and swift river, with many sharp bends divided in one or two places by rock islands, to the international boundary below Fort Sheppard, a distance of 32 miles from the head of the rapids. The general direction is due south. This part of the river is known as the 'Columbia River below Kootenay.'

The valley of the river from the 'Big Bend' south lies between two ranges of mountains, the Selkirks to the left and the Gold Range to the right. The mountains lose to a great extent their rugged appearance as the lakes are reached.

The banks and bed of the river are generally gravel and sand, thickly timbered, with an occasional rock bluff intervening.

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*Improvements above Golden.*—During the year 1899 the work done under the appropriation consisted chiefly in repairing and extending existing dams on the Columbia River, between Lake Windermere and Golden, in order to confine the river to the main channel.

## COLUMBIA RIVER ABOVE REVELSTOKE.

The work done under this appropriation consisted in removing rocks and boulders which were projecting above low water at Nine Mile Riffle, situated, as the name indicates, nine miles above Revelstoke on the Columbia River.

The details of the expenditure are :—

Wages.....	\$ 2,164 25
Material.....	214 67
Boat hire.....	65 00
Contingencies.....	5 50
Total.....	\$ 2,449 42

## COLUMBIA RIVER BETWEEN ARROW LAKES.

Operations, in connection with this service, were commenced at the end of February last and finished early in May. The work done consisted in repairs to the dam. This dam, which was built last year, had washed out slightly in the centre and required building up again with heavy rock. The second dam was lengthened 153 feet at the north end and 188 feet at the south end, the channel having cut its way through the bar at each end of the old dam. The third dam was repaired with brush and rock at the shore end, and some minor repairs were made to the fourth dam.

The bank of the river was protected with a brush mattress 40 feet wide and 2 feet thick, built in place from low water mark up. During the high water of 1899 the bank was cut away to a considerable extent and the gravel, etc., falling into the river, made it very shoal at this point.

The following are the details of the expenditure in connection with this service :—

Wages.....	\$ 5,447 22
Materials.....	609 26
Boat hire.....	52 00
*Contingencies.....	70 33
Total.....	\$ 6,178 81

\*This includes travelling expenses, expressage, &c.—

## DUNCAN RIVER.

The Duncan River rises in a meadow or depression lying about the centre of the Selkirk Range, a few miles south of the Canadian Pacific Railway.

From this depression flows also: (1) the Beaver northward to join the Columbia River at a point where the railway leaves it to climb the eastern slope of the mountains, and, (2) the north fork of the Spillamacheen south-eastwardly to join the Columbia 40 miles or so, in the latter direction, from Golden, a station on the Canadian Pacific Railway, at the junction of the Kicking Horse and Columbia.

Following a tortuous course for 50 to 60 miles through a narrow alluvial valley, from three-quarters to one mile wide, bearing one point east of true south, the mountains on both side rising precipitously from the plain, the Duncan widens



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out into Upper Kootenay Lake,  $10\frac{1}{2}$  miles long by from three-quarters of a mile to a mile wide. 2 miles from the lower end of this lake, the Lardo—a rapid and unnavigable affluent from the north-west, joins the Duncan at an acute angle, and 7 miles farther on, the combined waters enter Kootenay Lake about 21 miles from Kaslo, a town situated on the west shore. Below the confluence of the two streams the river has been called the Lardo, notwithstanding the fact that the Duncan, being very much the larger, is properly the main river. To prevent confusion, the river will be referred to hereafter as the Duncan, the Lardo being treated as the tributary.

Kootenay Lake, 1,730 feet above the sea, is about 72 miles long by about an average width of  $1\frac{3}{4}$  miles. It is the natural and, at present, the only available route by which the trade of the great southern central valley of the Selkirk Mountains, north of the boundary line, can be carried. There are two points on the lake waters at which transfers can be exchanged with the great railway lines. The first is Nelson, situated on the west arm or outlet of the lake, 36 miles from Kaslo, where freight and passengers are transferred in connection (1) with the Nelson and Fort Sheppard Railway and the Spokane Railway in the state of Washington, and (2), partly by rail and partly by boat, with the Canadian Pacific Railway at Revelstoke. The second is Bonner's Ferry, a small town in the state of Idaho, on the banks of the Kootenay River, about 50 miles south-east, by the river, of the boundary line, where connection is made with the Great Northern Railway line.

To accommodate the lake traffic there are 3 steamboat lines giving a daily service between points north of the line, with a bi-weekly service in summer, reduced to a weekly in winter, to Bonner's Ferry.

At Kaslo, a small line of railway called the Kaslo & Slocan, 3 feet gauge, said to be in the interest of the Great Northern, has been constructed to tap the Slocan country, lying west of Kootenay Lake, in competition with the Canadian Pacific Railway now operating a line, to the same interior points, called the Nakusp & Slocan, 4 feet  $8\frac{1}{2}$  inch gauge. Nakusp being situated on the east side of the Upper Avon Lake, connection is made by water thence with the Canadian Pacific Railway at the head of the lake. If an amicable arrangement could be arrived at between these rival lines, of which there is a remote possibility, the Duncan River country would be in closer connection with the Canadian markets.

To meet the requirements of the increasing outputs of these mines conveniently situated within easy transportation distance of the lake, two large smelters have been erected; one by American capital at Pilot Bay on the east shore of the lake, opposite the west arm or outlet; and the other at Nelson, by the Hall Mines Company, an English corporation, which has been built primarily to treat the ores from their own property lying on Toad Mountain south of Nelson, and also for the purpose of custom smelting.

It is contended that the Duncan country is as rich in minerals as any other part of the district, but, owing to the difficulties and dangers attending the transportation of freight, it is deprived of the advantages of reasonable freight rates, and its development is retarded. To mitigate the difficulties under which this section labours, it is proposed that the Duncan River, from the Kootenay Lake, be made navigable as far as practicable.

All the above claims are simply prospects, no development work having been done.

At the mouth of the Duncan River, on Kootenay River, there are extensive sand bars, through which by many channels the river finds the lake, the main channel being close to a rock bluff on the west side. There was not, on September 7, 1895, more than 2 feet of water in the deepest channel. Upon entering the river the low land bordering the banks is found to be of alluvial character, covered at first with alders and willows, which afterwards give place to larger

and merchantable timber. The current varies from 2 to 6 miles an hour and cuts the banks rapidly on the convex curve of the river. At intervals, up to the mouth of Cooper Creek, sharp, short pitches or riffles, where the river splits, are met with: the difference in level varying from 10 inches to 2 feet. The most serious of these riffles and splits, which will always, at low water, unless ameliorated, prove obstacles to navigation, occur below the mouth of Cooper Creek.

The difference in level between the lake and the mouth of the Lardo, a distance of  $7\frac{1}{2}$  miles, is estimated to be approximately 28 feet.

Duncan City, consisting of three houses with no permanent inhabitants, is situated about  $1\frac{1}{2}$  mile from the outlet of Upper Lake on its west shore.

Between the mouth of the Lardo and the Upper Lake, there are two places where the channel is split by island, rocks and gravel bars.

The drop, or difference in level, from the crest of the riffle to comparatively still water below, is in both instances not less than 2 feet. The depth of water in the shoalest parts was found not to exceed 24 inches.

The approximate elevation of the Upper Lake above Kootenay Lake is assumed to be not more than 36 feet. Allowing the distance between the lakes to be 9 miles, the average water slope would be 4 feet per mile. As will be inferred, however, the slope is not uniform, the river being a series of shallow riffles, in some instances short and sharp, with comparatively deep pools of water between, flowing with moderate velocity.

It is at these riffles—met with either at the mouths of tributaries or where the channel is divided, that the greatest difficulties to navigation will have to be overcome.

Throughout the entire course of this portion of the river, which may be termed the Lower Duncan, erosion is constant wherever the current strikes the bank. The consequence is that trees are either constantly falling into the stream, or overhang the banks sometimes partially submerged. These latter are called sweepers, and especially in bends are dangerous to boatmen. There are also to be found in every reach of low velocity, a number of sunken snags, and on the upper ends of islands and bars accumulations of drift timber.

Duncan City is laid out on a gravel beach, the highest point being 195 feet above the lake, which appears to have been formed by the detritus deposited at the mouth of an old channel of the Lardo River, now flowing south-east about  $1\frac{1}{2}$  mile to the westward. This old channel, it is assumed, discharged into the Upper Lake through a narrow rocky gorge or canon, now a pass, in a low spin or ridge of the mountains.

By careful barometric reading, it was ascertained that the water level of the Lardo  $1\frac{1}{2}$  mile to the west of Duncan City, was about 60 feet above the lake. Allowing 6 feet as the fall from the lake to the confluence of the Duncan and Lardo, the latter falls  $63\frac{1}{2}$  feet in  $3\frac{1}{2}$  miles. This settles at once the question of the navigability of the Lardo.

At the upper end of Upper Kootenay Lake, about 8 miles long, the Upper Duncan River enters the lake. The mouth here is similar in character to that of the lower river. There are the same extensive sand bars through which the river enters the lake by three channels, the principal one, however, being in this instance on the east, instead of on the west side, along a rock bluff.

Continuing up the river on the east bank, eight miles from the mouth, what is called Two-Mile Creek is reached.

The river over this portion passes with a sluggish current from side to side of the valley, three-quarters to a mile wide, sometimes skirting the foot of the mountains. The width varies from 200 to 400 feet. When the latter width exists, the current being further retarded, the depth is shallow, and numerous sand bars to some extent obstruct the channel. There are also present the usual snags, drift timber and overhanging trees or sweepers.

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From Two-Mile Creek to Bear Creek the features remain the same, though the width is generally less, the current in places is greater, and there is a larger number of snags obstructing the channel. About two miles above the creek there is a big log jam over 150 feet long. Above this jam the river is comparatively clear for about a mile, when a rapid formed by a large number of snags and drift timber is encountered. This is evidently the remains of a large timber jam. Another such rapid has to be passed before Bear Creek, twelve miles from the mouth the terminus of boating on the river, is reached.

It may be mentioned here that those who have prospected in the country, and freighted on the river, are of the opinion that above Bear Creek all freighting must be done by land trail or wagon road.

For reference, the following recapitulation of distances is given :—

Kootenay Lake to mouth of Lardo River.....	7	miles
Lardo River to Duncan City .....	3	"
Duncan City to Upper Kootenay Lake .....	8½	"
Upper Kootenay Lake to Bear Creek. ....	12	"
Total .....	30½	"

The alluvial land on either side of the river up to the foot of the mountains would, no doubt, prove valuable for farming purpose, if cleared and provided overflow were prevented. The timber is of fair size and consists of cedar, fir, spruce, cottonwood and alder.

The Duncan River, fed mainly by glacier and snow field streams, is highly charged with sediment during freshets.

The waters of the Upper Duncan, however, find a settling basin in the Upper Lake, thus relieving the Lower Duncan of its contribution. The finer sediment of the latter is deposited at the outlet forming the bar already referred to.

The watershed, or catchment basin, of the Duncan is of limited area, and in consequence of the deep shore, and comparatively bare mountain slopes, the ice and snow within its narrow bounds disappear rapidly when the weather is warm. To this may be attributed the short duration and intermittent character of the high water season, in those years when the freshet is not abnormal and the weather variable. When, however, the freshet is unusual—such as prevailed in 1894—there is but a slight difference in level between the upper and lower lakes, the whole valley between being submerged during the highest of the flood.

Continual rain does not seem to have any effect on the river, for what is rain in the valley is snow during the same season on the mountains. The water in the lower lake fell fully twelve inches between September 7 and 19, 1895, notwithstanding it had been raining almost continually since the 2nd of that month.

The obstruction to navigations in this river consist, first, of snags, drift timber and overhanging trees or sweepers, almost throughout its entire course, except in the Upper Kootenay Lake, and secondly, of bars at the mouth of the river in the upper and lower lakes, and of bars, splits in the channel, and rock in the channel between the lakes.

The river as far up as Bear Creek, in round numbers 30 miles from Kootenay Lake, can be made safe and passable, at high water only, for moderately large and powerful stern wheel steamboats, by the removal of all the snags, drift wood and sweepers from the channel, at a moderate cost. But to attempt to train the river and deepen the bars at the mouth, to make navigation possible at low water stage, would entail an expenditure larger than the present developments would justify.

The work of clearing the Duncan River from Kootenay Lake, of snags, overhanging trees and other obstructions to safe navigation, was resumed in the month of January, 1898, and continued until the month of April. The work was done in a most satisfactory manner and steamers were enabled to run in the spring

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through to the upper end of Howser Lake. It is now intended to improve the upper Duncan River.

The expenditure in connection with this service for the year ended June 30, 1898, was \$2,956.75.

During the year 1899 the sum of \$2,946.43 was expended in clearing the Upper Duncan River from Howser Lake to Hall's Landing, of snags, overhanging trees, log jams, and other obstructions to safe navigation.

The work was done in a most satisfactory manner, and it enabled steamers to run this summer to Hall's Landing, a distance of 18 miles from Howser Lake.

The work accomplished during the past fiscal year on the Duncan River consisted in building several dams to close small channels at the mouth, and clearing away a log jam at the head of the west channel.

The expenditure, in detail, was as follows:—

Wages.....	\$2,056.14
Materials.....	596.56
Inspection.....	134.45
Contingencies.....	43.25

Total.....\$2,830.40

#### FRASER RIVER.

The Fraser River is one of the largest besides being the most important of the many rivers of the Pacific province. It traverses or rather penetrates a country most diversified in its productions and undeveloped resources, both as regards the precious and other metals, as well as the products of the forest and soil. It has been well known since the early fifties, if not before, therefore there is no need, for the purpose of this report, to give a very extended description except in the direction of those natural features which bear directly upon the works undertaken, or upon those contemplated, for the training of the channel with the view to prevent erosion and overflow: and for the conservation, in a permanent and stable manner, of the ship channel from the city of New Westminster to deep sea water in the Gulf of Georgia.

The topographical characteristics of the Fraser throughout its entire course are in many respects similar to those of the Columbia River, lying to the south. Like it, the Fraser takes its rises in small lakes at the western base of the Rocky Mountains, and, keeping close thereto for some distance, flows in a north-westerly direction before it bents to the west, and eventually turns south. The headwaters are at an elevation of about 3,000 feet above the sea, in the vicinity of the Yellow Head Pass, through which it was at first the intention to build the Canadian Pacific Railway: lying a little to the south of the 53rd parallel of north latitude, between the 118th and 119th meridians of west longitude and but a short distance from Canoe River, which flows southward to join the Columbia at the Big Bend. The most northerly point of the stream is about 16 miles north of the 54th parallel on or about the 122nd meridian, whence its course is west for about 10 miles. Thence leaving the summit waters of the Peace River, which flow to the north, 5 miles or so to the right, the Fraser takes a general direction a little east of south as far as a place called Hope, situated on the left bank about 15 miles below Yale, which is the highest point of practical steamboat navigation and about 25 miles north of the 49th parallel, the international boundary line. From this point the stream gradually changes its direction, eventually taking a general course through the arable lands of the Fraser Valley, almost due west down to the Gulf of Georgia, into which it empties about 8 miles north of the boundary and 6 miles west of the 123rd meridian. Allowiag for the many bends and the frequent traverses of the valley, it is a close approximation

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to say that the length of the Fraser from its source to the gulf is not less than 900 miles.

Throughout this distance the river passes between and pierces many ranges of lofty mountains, on the sides and summits of which glaciers and snow fields abound, and among which, at the higher elevations, the snow measured as it fell, has been known to attain, in one winter, the great depth of 50 feet.

The lowest water occurs in the Fraser for a short period after the ice goes out, it then rises gradually by reason of the early spring rains; but it is not until the beginning of May, when the sun shines hotly, melting the mountain snow, that the settlers below Hope begin to anxiously watch the river. The first rise usually takes place in May, when the snow on the mountains along the lower reaches melts and seeks its natural outlet. This is generally followed by another and greater rise about June, or early in July, when the water of the melting snow and glaciers of the upper Fraser comes down. This is the time most dreaded, but strange to say, in 1895-96, contrary to past experience, the unprecedented high water, which has proved so disastrous to the lower Fraser Valley, was caused by the waters of the Thompson. Fortunately the first rise receded before the great bulk of the Rocky Mountain water arrived. Had both come simultaneously it is impossible to say to what greater extent the destruction of lands and changes of river bed would have been carried.

Previous to the commencement of railway construction, the high water of 1876 was the highest known and was accepted as the extreme. In 1882, however, the river rose higher, and this was similarly accepted as the extreme limit. This confidence was rudely dispelled in 1895-6. In one direction at least, the occurrence of this freshet may be considered as not altogether an unfortunate one, not unmixed with good. Had all the dyking and reclamation schemes proposed, based upon the high water of 1882, been completed, the destruction and loss of property from Hope to the Gulf of Georgia, would have been incalculable. The result will now be that all works undertaken, likely to be affected by another high water, will be designed to meet a flood of still greater height. It is not probable, but possible, that a combination of all conditions necessary to ensure the coming together of all the waters from the melting snows and glaciers over the whole area of the watershed of the Fraser, may happen. Such a contingency, though it may be considered by some remote, must be guarded against.

The erosion of the shores and bed of the channel, where it passes through or over easily disintegrated material, is constant, but of course is least during low water. As the river rises, the erosive energy of the current increases rapidly until the maximum is reached at the highest stage of water. The result of this constant and increasing eating away of the shores and bed, is, that an immense amount of material is carried down stream in suspension; the quantity being augmented by every tributary large and small, until, in the lower reaches, the water is in such a turbid state, so charged with sediment, that it more closely resembles a thick pea soup than anything else it can be compared to. The extent of the sedimentation that must occur every year, at the mouth of the river or elsewhere, where the current is at all retarded, as for instance where the banks are overflowed, or where the inflowing tide meets the river current, may be easily imagined.

Another source of sediment is the hydraulic mining operations now being carried on, with every prospect of being extended, along the Fraser and all its branches. Should the expectations of those interested, even only in part, be realized, it will be necessary to take steps to supervise operations, and insist upon reservoirs being constructed at the points where such precautions are or may be considered necessary, for the purpose of impounding the material and preventing it being carried down stream in great quantities and deposited on any valuable land that may be overflowed, to its total destruction, or on bars in the river channel to the detriment of navigation. Such has happened in California, and it is stated

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by those familiar with both countries, that the available paying hydraulic properties on the Fraser River are much in excess of those in California.

Below the canon at Vale, the bars and bed are chiefly coarse gravel and sand, the former becoming finer and finally disappearing below Miller's Landing. Thence outwards to the extreme limit of the Sand Heads in the Gulf of Georgia, the material composing the bars and the sides of the channel, for the most part, is a very fine, flaky silt, which when dry has a pearly or semi-metallic lustre. It is probably the result of the attrition of mica or talcose slate.

The destructive energy and capabilities of this surcharged freshet water are added to by the enormous quantities of drift timber borne along by the current. This drift comprises trees and timber of all sizes and descriptions, ranging from a cottonwood, cedar or fir, 150 to 200 feet long, with roots from 15 to 20 feet in diameter, and branches intact, to the ordinary saw-log or tree top. It may be either green timber recently fallen in, where the bank has been undermined, previously strauded timber or part of log-jams floated off by a higher water. The drift sometimes gathers in large rafts, and is is not difficult to realize the inherent destructive power of such a mass carried along by a current of great velocity, and the damage it will inflict when driven against a friable bank, dyke, bank protection, mattress work, wharf or bridge piers.

The river flow is affected by the inflowing tide, that is backed up to Chilliwack, about 48 miles above New Westminster, or 65 miles from its mouth. The diurnal fluctuation at Miller's Landing has been observed to vary between 12 and 30 inches in winter time.

At New Westminster, the range is for ordinary spring tides about five feet, but during freshet time, the water seldom falls more than a foot or 18 inches.

There is no surface movement up stream except during low fresh water stages.

At the rock wharf, inside the mouth of the river, the greatest range of one tide is 11 feet, though the extreme range, that is the difference between the highest and lowest observed tide waters is 11 feet. The greatest tidal range recorded by the automatic tide gauge put up in the channel through the Sand Islands, 2 miles from shore, is 14 feet; this occurred on January 11, 1894, at full moon, though the difference of level between the lowest and highest tide waters known is only 14.7 feet.

For the purpose of ascertaining the surface slope of the river during the freshet at all stages of the tide between New Westminster and the tide gauge on the Sand Heads, a distance of 18 $\frac{3}{4}$  miles, and between intermediate points, simultaneous tide gauge observations were taken on June 21, 1896, all the gauges being referred to one datum. The following table gives the condensed information thus obtained:—

River stretches.	Distance in Miles.	Difference of level at H. W. in feet.	Surface slope in feet per mile.	Difference of level at L. W. in feet.	Surface slope in feet per mile
New Westminster to Ewen's Cannery..	5.8	2.08	0.39	3.70	0.65
Ewen's to Laidlaw's Cannery .....	4.0	1.58	0.395	2.67	0.6675
Laidlaw's to Stone Wharf .....	5.0	0.92	0.185	5.37	0.674
Stone Wharf to Tide Gauge .....	3.9	0.75	0.192	3.71	0.95
Totals.....	18.7	5.33		13.45	

From the above it will be seen that the greatest surface slope between New Westminster and the gulf, therefore the swiftest current, is between the last men-

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tioned points in above table, and it is in the vicinity of the wharf, both up and down stream, that the greatest cutting of the banks has taken place.

The motive for the foregoing, perhaps rather extended description of the physical characteristics of the Fraser Valley, is the desire to convey a clear impression of the magnitude of those elements or factors which enter so largely into the solution of all problems connected with the regulation of river channels, in the direction either of preventing erosion of the banks or of improving navigation.

A suggestion has been thrown out that perhaps the main river might be permanently relieved of some of the surplus flood water by diverting the sources of some of its many feeders into the head-waters of other rivers, to which in many instances they are in very close proximity. The practicability of such a scheme can only be determined by examinations and correct levels. It may be added that such a proposition, however, appears to be, if anywhere, only possible with the branch streams above Lytton, and cannot seriously be considered with regard to the Thompson waters.

The work done in connection with this service may be classified as follows:—

1. Mattress protection of Westham Island.
2. Dam across channel through sand bar opposite Ewen's Slough.
3. Mattress protection of bank of river below Garry Point.

In 1899, eight hundred feet of protection work on the north shore of Westham Island was done, being a continuation of the work performed during the previous fiscal year. This work consisted in laying mattresses 100 x 25 x 2 $\frac{1}{2}$  feet, made up of alternate cross layers of brush laid on timbers which are bolted to a second set of timbers laid on top of the mattress, the whole being bound together with No. 6, galvanized iron wire. Four of these mattresses are fastened together with strong timbers into sections 100 feet square. The sections are then placed so that one rests on the edge of the bank and the other end floats in the stream. They are then loaded with rock and sunk in that position. All gaps due to the irregularities of the river bank are filled in with fascines and rock. In some places, where the size of the gaps will permit, smaller mattresses are built to fit in behind the larger ones and are sunk in the same manner.

The total area of bank protected was 80,000 square feet, making 200,000 cubic feet of mattress work and fascines, equal to 37 mattresses. The total cost of this work was \$8,434.30.

The cost per mattress sunk in place was \$227.91.

The cost per cubic foot was .0421 cents.

It was found necessary to close two sloughs and repair some of the work done the previous year where the bank had caved in and the old work had sunk slightly. This work was equal to 21 mattresses or 131,250 cubic feet, the cost being \$4,254.18.

2. The dam across the channel through the sand bar opposite Ewen's Slough was extended 700 feet and the part of the dam that was built during the previous year was raised to a height, in some places, of ten feet. This was necessary as the dam had subsided where the current had scoured out the bed of the river underneath it. The cost of this work was \$7,164.06, there being 264,400 cubic feet of brush and rock.

3. The balance of the appropriation available was used in continuing the protection of the bank of the river below Garry Point, 1,200 feet in length. This was done with mattresses, built and sunk in a similar manner to those described above at Westham Island, at a cost of \$12,847.80, including \$1,300.00 for extra fascines and 800 tons of rock, this being necessary on account of the work being exposed to the heavy seas of the Gulf of Georgia.

During the past year the work done consisted in protecting the bank of the Fraser River at Grant & Ker's Mill at Ladner, repairs to existing work at Westham Island and Garry Point, and continuation of protection work below Garry Point.

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The bank at Grant & Ker's Mill was protected for 600 feet, with 20 mattresses 100'x 26'x 2¼' thick and 2 mattresses 50'x 26'x 2¼' thick.

The cost of this work was \$5,138.00.

Repairs to existing work at Westham Island consisted in sinking 24 mattresses, of various dimensions, along the bank where it had caved in since the original work was done. Extra rock, to the amount of 400 tons, was also placed on the old mattresses. The cost of this work was \$3,800.00.

Repairs to existing work at Garry Point consisted in sinking 34 mattresses of various sizes at several places that required strengthening. 400 tons of extra rock was used in connection with this work. The cost amounted to \$5,574.00.

The protection works below Garry Point were continued seawards 900 feet, the material used consisting of 32 mattresses, 100'x 26'x 2¼', and 200 tons of rock in addition to the amount usually used in sinking the mattresses. The cost of this work was \$7,777.78.

The total expenditure during the year, in connection with the Fraser River, was \$24,921.00, as follows :

Work at Grant & Ker's Mill, Ladner.....	\$ 5,138.00
"    Westham Island (repairs).....	3,800.00
"    Garry Point (    "    ).....	5,574.00
"    "    new work.....	7,777.78
Superintendence.....	1,521.00
Tide gauges.....	530.00
Material on hand.....	580.22
<b>Total.....</b>	<b>\$24,921.00</b>

The details of the expenditure are as follows :

Wages.....	\$ 9,896.70
Provisions.....	2,995.58
Materials, wire, iron, &c.....	6,565.21
Superintendence.....	1,521.00
Tide gauge attendants.....	530.00
Tug hire.....	3,192.75
Coal.....	110.55
*Contingencies.....	109.21
<b>Total.....</b>	<b>\$24,921.00</b>

\*This amount includes light, telephone, washing, &c.

#### KOOTENAY RIVER.

The Kootenay River takes its rise in the heart of the Rocky Mountains, a little north of the 51st parallel, 16½ miles north-east of Leancoil, a station on the line of the Canadian Pacific Railway. It flows for some distance in a south-easterly direction, and then changing to the south-west, it passes within a mile and a half of the head waters of the Columbia River. At Canal Flat it again changes direction and pursues generally a direction a little east of south to the international boundary line, which it crosses at Tobacco Plains, about 6 miles west of the 115th meridian. The Kootenay enters Canada again at Beddington, about 20 miles east of the 117th meridian. Thence flowing a northerly course it enlarges into the Kootenay lakes, 72 miles in length, 28 miles by the river from the boundary line. The outlet of the lake is on the west side, about 30 miles north of the inlet, whence it flows in a south-westerly direction, joining the Columbia River about 21 miles north of the boundary line.

During the year 1899, two dams were built across sloughs on the Kootenay



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River, to confine the water to the main channel through the gravel bars below the mouth of Wild Horse Creek. The dams were built of alternate layers of rock and brush laid between two rows of piles, the sides being sloped with gravel and faced with heavy rock.

This work was undertaken with the object of improving the navigation of this river between Fort Steele and Wardner, the latter being the point at which the Crow's Nest Branch of the C. P. R. crosses the Kootenay River.

During the past fiscal year work was commenced on December 1st, 1899, and completed on March 17th, 1900, and consisted in repairing and lengthening the old dam across the large slough about one mile below Fort Steele.

The lower end of the dam was renewed for 80 feet and 210 feet of new dam was added, the whole of the rear face was rebuilt, and 196 feet of mattress protection was built at the ends to prevent them from being washed away.

The details of the expenditure are :—

Wages.....	\$2,407 76
Materials.....	273 96
Inspection, etc .....	111 65
Total.....	<u>\$2,793 37</u>

## LEWES RIVER (YUKON DISTRICT).

Lewes River is on the principal route to the Yukon district. The river is generally crooked in its course and obstructed at certain places by boulders.

During the last fiscal year an examination of the river was made in view of improving the channel and work was commenced. At Caribon Crossing a dam 400 feet long, 12 feet wide and 10 feet high was constructed. Two lifting barges were built for the removal of boulders from the Six Mile and Thirty Mile rivers, the work on Thirty Mile River was completed. At Rink Rapids, two guide piers are being constructed, which will greatly improve the navigation at this part of the river.

The amount expended during fiscal year 1899, for surveys and improvements of the river is \$24,836.57.

## NANAIMO HARBOUR.

The Dredge "Mud Lark" was employed in deepening the South channel of Nanaimo Harbour, to 30 feet at low water, from the 23rd September, 1899, to the end of March, 1900.—

The following table shows the time the dredge was employed in the dredging, repairing, etc., as well as the quantity of material removed and coal used :—

Material removed, hard sand.....	58,160 cub. yds.
Coal used, tug "Princess".....	201,125 lbs.
" " dredge "Mud Lark".....	602,210 "
Hours dredging.....	1,034
" repairing.....	198
" sundries, including coaling, watering, moving, etc.....	338

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The followings is statement, in detail, of the expenditure :—

Wages .....	\$ 4,930 10
Materials .....	1,717 39
Provisions .....	1,526 68
Coal .....	1,459 12
Tug hire .....	50 00
Water .....	56 00
Contingencies .....	20 70
Total .....	\$ 9,759 99

#### SKEENA RIVER.

The Skeena River lies in the north-western portion of British Columbia. It derives its source from lakes and glaciers situate between the 56th and 57th parallels of north latitude and between the 126th and 128th degrees of west longitude. It flows generally in a south westerly direction and empties into the waters of the Pacific Ocean by way of North Skeena, Telegraph, and Malacca Passages, Chathan Sound, &c., at a point a little north of the 54th parallel of north latitude, and a few miles west of the 130th degree of west longitude, and about 650 miles, by the inner passage, north-west of Victoria. The principal post office and port on the Skeena is Port Essington, lying on the south shore of the estuary, at the confluence of the Skeena and Oxtail rivers, 13 miles east or inland of the entrance passages. It is navigable by light draught steamers, when the water is not too high, from May to the end of September, as far up as Hazelton, a Hudson's Bay company post, established on the south bank at a distance of about 173 miles from the mouth of the river. This post is the distributing point for the mining and grazing country lying to the north and west towards the Rocky Mountains and Peace River country, and to some distance to the south.

In 1899 bars and channels were cleared of snags and drift wood so as to improve the salmon fishing grounds in the tidal waters of the estuary which extends inland about 25 miles.

During the past year. Work was commenced, at the end of October, 1899, at Kitsilas Canon and closed down on the 1st of March, 1900. Ten rocks and reefs were removed by blasting.

At Beaver Dam, 12 miles below Hazelton, three rocks were removed.

At Kitsegukla, four large boulders were removed.

At little Canon, two rocks were blasted but the rock was not removed.

The expenditure in connection with the removal of rocks at the above points was as follows :—

Freight, supplies, etc .....	\$1,029 46
Wages .....	1,534 20
Total .....	\$2,563 66

The work of removing snags at the mouth of the Skeena River was commenced on the 21st May, 1900, and closed down on the 23rd June.

The expenditure in this connection was as follows :—

Wages .....	\$499 00
Hardware, etc .....	48 40
Tug hire .....	345 00
Total .....	\$892 40

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## Total on Skeena River :—

Removal of rocks.....	\$2,563 60
Snagging.....	892 40
Total.....	\$3,456 00

## STIKINE RIVER.

## . (Route to Yukon.)

On March 10, 1898, orders were issued by the department for an examination of a water route from the Pacific coast to the Yukon district all through Canadian territory, via the Stikine River, Teslin Lake, and the Hootalinqua, Lewes and Yukon Rivers. With a few of rendering this route immediately available, as far as practicable, for the transportation of miners and settlers, desirous of reaching the newly discovered Klondike gold fields with their outfits and provisions, authority was also given to carry on such preliminary work as might be found urgently needed to improve navigation over the most obstructed and dangerous rapids and reaches of the chain of rivers and lakes just named, either by snagging, removing rocks, &c., or otherwise. At the close of the year ended June 30, 1898, this examination was in progress, and the work of snagging, &c., as will be described below, had been commenced on the Stikine River.

The Stikine River has its source in the southern part of Cassiar district, and runs a distance of nearly 130 miles up to the 58th parallel, where it suddenly makes a sharp bend then turns almost due south to within twenty miles of its mouth, a distance of 150 miles. From that point it runs in a westerly direction and empties into the Stikine Strait (Pacific Ocean) between the islands of Wrangel and Mitkof. The total length of the river is approximately 300 miles. The mouth of the Stikine proper is situated ten miles from the port of Wrangel, between Point Rothsay and Farin Island, where it has a width of 2½ miles. It is subjected to high tides varying from 18 to 26 feet (neaps 18 feet, springs 26 feet) which affect the river as far up as the Ka-te-té River, a small tributary which empties into the Stikine, 25 miles from its mouth.

At lowest water the estuary of the river is, for about two hours, and for a distance of about five miles from the sea, a sand flat through which the stream winds its course, being about 20 inches deep; but owing to the great range of the tides this part of the river is easily navigable, and as soon as the flood has risen 4 or 5 feet, there is abundance of water for any river boat. The width of the river for the first twenty-five miles varies from two and a-half miles to 500 feet, although in some places islands divide it into several channels, the largest of which is about 200 feet in width. In the lower reach of the Stikine River the main obstructions to navigation were found to consist of snags and large trees overhanging the banks of the river, and in March, 1898, the snag boat *Samson*, doing service on the Fraser River, was commissioned for work on this river. This snag boat had first to be laid up for necessary repairs and alterations at New Westminster. These repairs and alterations consisted of renewing a number of planks and keelsons, which proved to be decayed, and putting in eleven watertight compartments which had the effect of strengthening her considerably. The boiler and steam pipes were also newly covered and the boat was completely repainted. Many minor repairs to her machinery, &c., were also made, and the boat was equipped with new ropes, four new row boats, a set of new snagging chains, a new outfit of tools, and two large Benton head-lights; provisions and supplies were procured for a seven months' cruise.

The *Samson* arrived at Wrangel only at the end of April 1898, having been delayed by gales at different places. The boat proceeded up the river as far as

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the 75th mile, but there, the river proving too rapid to allow the boat to go farther, instructions were given to commence the removal of snags and other obstructions at that point, and work down stream as far as the 50th mile, comprising the worst portion of the river for snags between Glenora and the mouth. A party of eight men was also organized to remove snags and other obstructions from the channel between the 80th mile and a point about ten miles below Glenora. This work consisted chiefly of blasting snags with dynamite, and cutting down overhanging trees and sweepers from the banks.

The total expenditure in this connection up to June 30, 1898, amounts to about \$14,000.

During the fiscal year 1899, the work of improving the channel of the river was continued.

The snag boat *Samson* was employed in removing snags and obstructions, and a party of eight men, under Messrs. Lemoine and Jarmin, were engaged in removing snags and other obstructions from the channel between the 80th mile and a point about 10 miles below Glenora. This work consisted chiefly of blasting out snags, &c., and cutting down overhanging trees and sweepers from the banks.

The total amount expended during the year in connection with this work is \$15,445.85.

#### WILLIAM'S HEAD QUARANTINE STATION.

The British Columbia quarantine station at William's Head is situated about eight miles south-east of the city of Victoria, and covers an area of about 60 acres. In the spring of 1892, a deep water pile wharf was built in connection with this quarantine station, the government supplying the Muutz metal required for covering the piles, to prevent them from being destroyed by sea worms. The wharf is situated at Parry Bay, which opens towards the north and Victoria on the west side of William's Head. It is 480 feet long by 40 feet wide, and has an approach 320 feet on the south side leading to the hospital residence and first-class passenger shelter houses, and another on the north side leading to the disinfecting apparatus and to the Chinese and Japanese shelter houses.

During the year 1899 the expenditure in connection with this service amounted to \$5,040.23.

During the past fiscal year the repairs to the wharf consisted in putting in diagonal braces from low water to the under side of the wharf. This became necessary owing to the original brace piles being eaten off by teredos.

All the buildings on the wharf, and hose boxes, were painted, and a telephone was installed connecting the station with the house occupied by the caretaker of the pipe line, a distance of about three miles.

The details of the expenditure are :

Wages.....	\$ 586.93
Materials.....	394.73
Painting.....	473.39
Installing telephone.....	197.05
Total.....	<hr/> \$1,652.10

#### DREDGING OPERATIONS.

During the fiscal year ended June 30, 1900, dredging operations were carried on in the undermentioned localities, chiefly by the government dredging fleet : but in some instances with hired dredging plant. The limited number of dredge vessels owned by the Public Works Department is far from being sufficient to

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carry on satisfactorily the extensive operations which the federal government is from year to year called upon to undertake, owing to the steady increase in the tonnage and draught of vessels generally and the pressing need of deepening harbours on the sea coasts, so that they may be easy of access and afford fairly good accommodation for shipping, landing and sheltering purposes to both steam and sailing vessels at all stages of the tide, improving existing highways of navigation, opening new routes and harbours on inland waters, &c.

## PROVINCE OF NOVA SCOTIA.

Cook's Cove—Guysboro County.  
 Grand Etang—Inverness "  
 Halifax I. C. Ry wharfs—Halifax County.  
 Harbour au Bouche—Antigonish "  
 Milton (Yarmouth)—Yarmouth "  
 Pictou Bar—Pictou "  
 " Landing—Pictou "  
 " Acadia coal Co's wharf—Pictou County.  
 Yarmouth: Bakers wharf—Yarmouth "  
 " Main channel—Yarmouth "  
 " Dominion Atlantic Ry Basin—Yarmouth County.  
 Law's wharf—Yarmouth County.

## PROVINCE OF PRINCE EDWARD ISLAND.

Charlottetown Railway wharf—Queen's County.  
 " Pooles wharf " "  
 French River New London " "  
 Melpeque—Prince County.  
 Summerside " "

## PROVINCE OF NEW BRUNSWICK.

Chipman: Curley's shoal—Queen's County.  
 " Wards shoal— " "  
 Gemseg shoal— " "  
 Ox Island shoal—Suubury County.  
 Robinson's shoal York "  
 Springhill shoal—York "  
 St. John harbor winter port—St. John County.

## PROVINCE OF QUEBEC.

Buckingham.	St. François.
Chateauguay.	St. Jean des Chaillons.
Coteau Landing.	St. Nicholas.
Dorval.	St. Laurent d'Orléans.
Isle Perrot.	St. Michel de Bellechasse.
Lothinière.	Richelieu River.
Ottawa River (Green shoals).	Yamaska River.
Pointe Claire	Valleyfield.
Rivière du Lièvre.	"

## PROVINCE OF ONTARIO.

Cobourg.	Newcastle.
Belleville.	Oakville.
Deseronto.	Oshawa.
Collingwood.	Port Hope.
Hamilton.	Pictou.
Fort William.	Rockland.
Kingston.	South Nation River.
Jordan.	Thornbury.
Hawkesbury.	Wolfe Island.
Meaford.	Whitby.

## PROVINCE OF NOVA SCOTIA.

## DREDGE "ST. LAWRENCE."

At the beginning of the fiscal year 1899-1900, the dredge "St. Lawrence" was operating at Pictou Landing, Pictou Co. deepening to 25 feet L. W. S. T. making berths for steamers at this branch terminal of the I. C. Ry. The material excavated was principally mud with occasionally boulders, these and the sticky nature of the mud caused detentions, the material sticking in buckets and hopper. Delays were also occasioned by the movements of steamers at the piers interrupting the work of the dredge, some bad weather and the long run of twenty miles to deposit and return.

The dredging was, however, vigorously pushed when possible. On the 31st July it was suspended to take up work of the bar at Pictou Harbour entrance August 1st. This dredging was to 19 feet L. W. S. T. through mud and sand and the spoil was taken about 8 miles to deposit. Heavy gales interfered with the work at times so much that mooring chains were broken; 18th a plank broken off hopper door necessitated the dredge going on slip for repairs. Work was resumed 24th and continued to 5th September on the bar by which time it was sufficiently reduced.

The work at Acadia Coal Company's wharf, Pictou Landing, was then taken up as had been ordered. This was the removal of a lump on shoal in the vicinity to leave 19 ft. L. W. S. T. From 6th to 9th September, the dredge was employed here and removed 1750 cubic yards of mud, deposited 9 miles distant. Pictou Landing work was again taken up 11th to 13th when orders were received for this dredge to go to Cooks Cove, Guysboro Co., and do some work in the pond there. Preparations were made out and dredge sailed, arriving on the 18th. After examination and soundings it was found that this dredge could not work here, had too much draft and the place dangerous for her. She was again ordered back to Pictou, and by 21st had resumed the Pictou Landing work. On 23rd orders were received for her removal to the entrance of Guysboro Harbour. These were reconsidered, the place being found to be one at which the dredge could not operate, and the Pictou Landing work was again taken up and continued to 31st October. During this year, the quantity excavated at Pictou Landing was 39,200 cubic yards. At Pictou Bar 23,800. The dredge was now under orders for Halifax, N. S., to deepen at I. C. Ry. terminal docks. Preparations were made accordingly and dredge sailed 4th November, bad weather having caused some detention and on the passage, storms obliged making harbors. Arriving on 7th, preparations were made at once for work and it was underway 9th, removing rocks, boulders and boxes of tin, the latter thrown over at time of fire. This work was difficult and was rendered more so by interruptions and movements of steamers coaling, dredge being ordered away, dock full of steamers from 17th to 27th. At the latter date dredging was resumed and 18th December, the work at Halifax pier was completed as nearly in accordance with the plans and instructions as the nature of the bottom would permit. The depth of 25 and 30 feet could not be obtained at some points owing to the ledge rock bottom, 24 feet being all possible, 7875 cubic yards were removed, and the dredge, 18th December, was ordered into winter quarters. During the winter dredge was placed on marine slip and necessary repairs made, hull cleaned, scraped and painted, hopper, gear and machinery put in good shape and by 21st April was waiting orders for crew and work. Orders were received to send dredge to Summerside, P. E. I. to improve the channel there for winter service, and preparations were made for the passage. Dredge left Halifax 26th, put into

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Pictou on the way and on 1st May arrived at Summerside. Preparations were at once made for the work, which was the cutting of a channel across a bar and deepening it to 20 ft. L. W. S. T. Here it remained prosecuting the work vigorously up to and at the end of the present fiscal year. The material removed was principally sand and clay and deposited at a distance of about 4 miles. At the end of the year 27,650 cubic yards had been excavated at Summerside, work progressing favourably.

The total amount dredged during the year by the "St. Lawrence was 100,275 cubic yards.

## THE DREDGE "CANADA."

At the beginning of the present fiscal year, was at Yarmouth, prosecuting the work of the improvement of that harbour, at which it continued during the season. It comprised the deepening and widening of the harbour channel, a basin for turning, opposite the D. A. Ry. wharfs, channel towards Lewis' wharfs and the docks of Mr. Law and Mr. Baker. The depths at the different localities varied from 4 to 16 feet. There were some detentions on account of weather. The dredge had to go on marine slip there in July to repair hopper door chain connections, clean and paint bottom, repair boiler, etc. The material excavated at Yarmouth is principally mud, shells, etc., and the run to the place of deposit 4½ to 5 miles.

On first January orders were renewed for this dredge to go to Halifax and preparations were accordingly made. Left Yarmouth 4th and when off Chebogue Point the boiler commenced to leak and dredge had to be towed back to Yarmouth, which place was reached 2 p.m. 5th. Dredge was dismantled, crew paid off, excepting Captain, engineer and fireman, and repairs undertaken without delay. Dredge went on the marine slip and had hull cleaned, scraped and painted. The repairs to boiler, machinery and gear were extensive, and during the winter, made principally by Burrill-Johnson Company and A. H. Saunders. Buckets and blacksmith work by Robertson & Co. and H. A. Gridley. Keel and hopper doors were also repaired. In the spring, everything being complete, dredging was resumed at Yarmouth as instructed. In the channel from 9 May to 30th June, except at periods between 12th and 28th May when dredging at Baker's wharf was done. The amount of excavations of this dredge during the year are as follows:

D. A. Ry. Basin.....	17,820	cub. yds	16	ft	depth	L.W.S.T.
Channel to Lewis wharf..	9,630	"	"	4	"	"
Laws wharf.....	900	"	"	4	"	"
Bakers wharf.....	2,700	"	"	5	"	"
Yarmouth channel.....	9,145	"	"	16	"	"

Making a total for the year of 40,095 cub. yds.

The work at end of fiscal year progressing favourably as possible.

## THE DREDGE "NEW DOMINION."

At the beginning of the fiscal year 1899-1900 the dredge "New Dominion" was at Salmon River, Queen's County, N.B., improving the channel over Wards and Curley's shoals, near Chipman, deepening to 9 feet low water summer level. The material removed was principally sand, and towed to deposit a distance of about two miles. Some delays were caused by accidents to tug and machinery, waiting for scows owing to the shoal water and scows grounding on dumps.

The work was prosecuted vigorously until 23rd October, when in compliance with the orders received, the dredging plant was removed to Jemseg 24th, and

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took up the work of further improving that river near its confluence with the St. John. This work was to 10 feet low water summer level, the spoil sand and place of deposit two miles distant. The work was pushed perseveringly until 11th November when the weather obliged its abandonment for the season, and dredge was towed to St. John for wintering and repairs.

The several works for the year comprise the removal at Wards shoal of 34,750 cubic yards, Curley's shoal 51,025, and at Jemseg river 3,600. Total, 69,375 cubic yards.

#### THE DREDGE "PRINCE EDWARD".

At the beginning of the fiscal year, the "Prince Edward" was at Charlottetown P. E. I. continuing the dredging at the P. E. I. Railway terminies to 25 feet L. W. S. T., This was suspended 15th July, and from 17th to 22nd Pooles wharf work was done, then returned to the railway wharf to deepen the approach and berths for steamers, some of the dredging here, the inner 100 feet stretch, was to but 22 to 16 feet on account of ledge rock, the work was finished 9th August and dredge did further work at Pooles from that date to 12th deepening to 18 feet L. W. S. T.; dredge was now prepared for transportation to Malpeque Prince county P. E. I., there was considerable detention in making all ready for this, somewhat dangerous trip and in arranging for tug. The "Stanley" was finally secured and with the "Aitkin" assisting the plant, was started on the 19th from Charlottetown, had to put into Summerside, left there 21st and arrived at Malpeque 23rd August. The scows broke away during the passage, tearing out bitts but they were recovered by the tug "Aitkin" and towed into Malpeque, considerable time was required in getting the plant prepared for work and on the 30th dredging was under way improving channel and deepening to 10 feet L. W. S. T., the material excavated was mud and place of deposit about 1 mile distant, there were some delays on account of weather, accident to tug, etc., but good work was done and by 6th November, the harbour dredging was completed in accordance with plan, the dredge was now ordered to French River, New London P. E. I. and preparations were made for its removal to that place, there was detention in carrying out orders, storms and high tides, snow, etc. The plant got into French River on the 11th., but the continuance of bad weather prevented dredging until the 16th, when it was fairly under way, deepening channel of river to 10 feet, removing soft mud and depositing it a distance of about  $\frac{1}{4}$  mile.

This work was prosecuted vigorously until the lateness of the season compelled its suspension and dredge went into winter quarters at French River 8th Dec.

During the winter the plant was overhauled and repaired as far as possible and made ready for spring operations, May 5th, found the dredge at work continuing the deepening and improving of French River, channel to 10 feet L. W. S. T., the work had however reached so shoal a part of the river that the tug was of only partial service, the low tides adding to the inconvenience and detention; at the end of the year the work was being carried on perseveringly and progress made toward completion.

At Ch'town P. E. I., wharf the excavations amounted to 6503 cubic yards, at Pooles wharf Ch'town 5805 cubic yards and at Malpeque, Prince County 28575 cubic yards were removed and at French River by the end of the year 25831 cubic yards were excavated making a total for the year by this dredge of 66714 cubic yards.

#### THE DREDGE "GEO. MC KENZIE"

At the beginning of the fiscal year the dredge was at the Grand Etang, Inverness Co. N. S., deepening in the pond and entrance thereto between the breakwaters to 5 feet L. W. S. T., the material removed was stone and gravel and the place of deposit  $\frac{3}{4}$  mile distant. The work will much improve the place and benefit



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the fishermen engaged there, on the 12th August, the work was completed to the expressed satisfaction of the people prominent there, the dredge was then under orders for Harbour au Bouche, Antigonish Co., N. S., and preparations were made for its removal; on 18th the plant left Grand Etang, in tow of S. S. "Luneburg" the "Shannon" assisting and on 19th arrived at Harbour au Bouche, preparations for dredging completed and work began 23rd. This work is the deepening and improving the bar at entrance to 14 feet and in the harbour to 12 feet L. W. S. T., the material moved is mud, stone and gravel, place of deposit about  $\frac{3}{4}$  mile away, the work was carried on until the 20th December when the plant was ordered into winter quarters, one scow sent to slip at Hawkesbury to be resheathed caulked, new chains on doors, etc.

The dredge had gear and equipment overhauled and repaired and everything put in readiness for the opening of navigation, on 22nd April; dredging here was resumed and on 31st May was completed, the dredge being under orders for Cooks Cove, Gunpboro Co., N. S.

There was some delay on account of weather and getting tug for transportation and it was 5th June, before the plant left Harbour au Bouche; 6th plant placed in Cooks Cove and preparations made for dredging, which was underway on 8th., there was considerable undertow, low tides, shifting dredge, etc., to cause detention but fairly good work was done during the balance of the month and a quantity of 4895 cubic yards were excavated, consisting of stone, gravel and sand and deposited about  $\frac{1}{4}$  mile distance, the depth given was 10 feet L. W. S. T. and work progressing at end of year.

During the year the dredge removed at Grand Etang, Inverness Co., 10555 cubic yards, at Harbour au Bouche 23520 and at Cooks Cove 4895 making a total for year of 38970 cubic yards.

## THE DREDGE "CAPE BRETON."

At the beginning of the present fiscal year was operating in the harbour of St. John, N. B., improving winter port berths. The work was to 25 ft. and 28 ft. L. W. S. T., and the material removed principally clay, stone and boulders, some logs. The place of deposit about  $2\frac{1}{2}$  miles distant. Considerable difficulty and detention was met on account of the boulders, neap tides, sticky materials clinging to the bucket, and repairs necessitated. The work was prosecuted vigorously, however, the time being extended to October. Tug service was furnished by the city. The dredging was further extended until 18th November, when orders were given to lay up the plant for wintering and repairs.

During winter all the gear and machinery of the dredge was overhauled, engines, boilers, buckets, crane, etc., put in thorough order. Barges were repaired, having doors straightened and strengthened and the whole plant in complete working condition for spring orders with the exception of painting required to hulls and bottoms, reported on several occasions. First of June orders were received for the dredge to go to work for the city of St. John, N. B., in the harbour at Sand Point, winter port slips, where it had done considerable work previously. By 4th operations were underway, deepening to 28 feet L. W. S. T., and removing mud, stone, logs and boulders. The place of deposit was  $2\frac{1}{2}$  miles distant, Towage provided by the city. The work was vigorously prosecuted under the conditions as the tides served, logs and boulders at times causing detention. At the end of the fiscal year, the work was being prosecuted vigorously. The total removed by this dredge at St. John during the year was 80,335 cubic yards.

## THE "CLAM SHELL DREDGE."

At the beginning of the fiscal year this dredge was operating at Springhill York Co., N.B., deepening to  $3\frac{1}{2}$  feet low water summer level over shoals in the St. John river in that vicinity improving the channel and inland navigation. The material removed was gravel and sand with fine silt and place of deposit about  $\frac{5}{8}$  of a mile distant. At the end of August, the water falling so low and the work therefore so slow and difficult it was decided to remove the dredge to Robinson's bar, farther down river. Work was closed at Springhill and the dredge was towed to Robinson's bar, and was at work by 5th September. The material of this bar is, in places, very hard compact clay and gravel, and the work was slow. The distance to place of deposit about 250 yards. There was detention on account of repairs required to bucket, wire cable, lever, etc. The depth required was 6 feet low water. By 26th October the work was completed and the dredge was removed to Ox Island shoal, Sunbury County, St. John river, and 28th work was under way there deepening to 10 feet low water, removing sand to a place of deposit  $\frac{1}{2}$  mile distant.

The work was pushed well until the weather and anticipated closing of navigation forced its abandonment 12th November. The dredge plant was then towed to St. John for wintering and repairs. During the winter, gear and machinery were overhauled and repaired, boiler had attention and the plant put in thorough order for work. The steam tug "Cricket" which is with this dredge wintered in the same place and had attention.

In May, 1900, orders were received to take this plant up river to Springhill, York County, and resume the dredging there. Arrangements were made for towing, and on 17th May the dredge and scows were taken through the falls; 18th, started up river, arriving at Fredericton 19th, and at Springhill 21st. The water, owing to the extraordinary freshet was found too high for work at once, and the many logs running on the river necessitated the making and placing of a boom to shear them off.

Dredge got into position and to work on 28th, deepening to  $4\frac{1}{2}$  feet low water summer level, and depositing the material, gravel, about  $\frac{1}{2}$  miles distant. The current was very swift, and the work somewhat dangerous, but vigorously prosecuted until 20th June, when the tug "Cricket" was accidentally overturned and went to the bottom. On being lifted it was laid off for repairs and difficulty was found in getting another tug suitable for the work. The "Bismark" was tried for a day but found unable for the work. Unable to get a boat the hands shovelling were discharged until repairs to "Cricket" were completed. The dredge crew employed on machinery, painting, etc., which was in progress at end of year.

This dredge operated to the close of the present year at Springhill, York Co., removing a total of 1,492 cubic yards. At Robinson's bar, removing 6,965 yards, and at Ox Island Shoal, Sunbury Co., 4,340 cubic yards. The total for year being 26,225 cubic yards.

## MILTON, YARMOUTH COUNTY, N. S.

*Hand Dredging.*

Two scows were hired and hand dredging done at Milton, Yarmouth County, N. S., removing a lump from the river channel in front of F. H. Wilson & Co's. wharfs.

At the close of fiscal year 343 cubic yards had been removed.

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## DREDGE VESSELS REPAIRS AND WINTERING, ETC.

## MARITIME PROVINCES.

The following amounts were expended on repairs and removals to dredges and plant, during the year 1899-1900.

" St. Lawrence" .....	\$ 4295 10
" Canada" .....	4697 18
" New Dominion" .....	2061 70
" Prince Edward" .....	2101 75
" Geo. McKenzie" .....	1312 71
" Cape Breton" .....	1763 77
" Clam Shell" .....	1664 66
	<hr/>
	\$ 17896 87

## NEW DREDGING PLANT.

" Cape Breton" winches, hopper, doors & buckets..	\$ 3642 58
" Clam Shell" scow & bucket .....	1500 00
" Cricket" steam launch .....	1000 00
	<hr/>
	\$ 6142 58

Memorandum of quantities removed by the several dredges in the Maritime Provinces during the fiscal years.

	1898-99 Cubic yards	1899-1900 Cubic yards
" St. Lawrence" .....	70,790	100,275
" Canada" .....	53,040	40,095
" New Dominion" .....	54,050	69,375
" Prince Edward" .....	51,040	66,714
" Geo. McKenzie" .....	31,680	38,970
" Cape Breton" .....	50,308	80,335
" Clam Shell" .....	700	26,225
Hand dredging .....	—	343
	<hr/>	<hr/>
	311,608	422,332

Being 111,724 cubic yards of an increase the present year.

## COOK'S COVE GUYSBORO CO., N. S.

A fishing and farming settlement and in Guysboro County. 3 miles from from Guysboro and 44 from Antigonish with a population of about 300.

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The Cove or harbour had the attention of the department in the matter of dredging this year the dredge "Geo. McKenzie" having been employed from 5th to 30th June and the work was progressing at the beginning of the new year.

The dredging was to 10 feet L. W. S. T., removing stone, sand and gravel and depositing at a distance of about 2 miles, the place is difficult, heavy under-tow and hard digging, weather also interfered with the prosecution of the work considerably, the present year, in the time mentioned a quantity of 4895 cubic yards was removed, cost per cubic yard 0.38.37.

#### DREDGING AT GRAND ETANG, INVERNESS COUNTY, N. S.

A fishing settlement with a population of about 400 in the district. There are stores, lobster factory etc. The harbour had attention of the department, as to dredging, this year, the dredge "Geo. McKenzie" having operated here from 1st July to 13th August concluding the work began the year previous, removing 10,555 cubic yards of stone and gravel from the pond and between the piers to 5 feet L.W.S.T. and depositing the material at a distance of  $\frac{3}{4}$  mile.

This work was completed 12th August to the expressed satisfaction of prominent people of the place. Cost per cubic yard 0.20 c. 93.

#### DREDGING AT HALIFAX N. S. I. C. RY PIERS.

A terminus of the Intercolonial Railway, had the services of the dredge "St. Lawrence" in November and December 1899 This work was difficult and delays was frequent on account of the movements of steamers, nature of the dredging etc. The depth required was 28 and 30 feet L.W.S.T. This could not in some parts be obtained owing to ledge rock where 24 feet was all possible. Rocks, boulders and boxes of tin were removed, the latter thrown over at time of fire. The distance to deposit about four miles.

The work was completed as nearly in accordance with the plans as possible. 7,875 cubic yards were removed and expenses paid by the I. C. Ry. Cost per cubic yard 0.33c. 45.

#### DREDGING AT HARBOUR AU BOUCHE, ANTIGONISH COUNTY N. S.

A settlement and extensive fishing station on George Bay. Has a population of about 750. The harbour is small but convenient for schooners. The dredge "Geo. McKenzie" arrived here the 19th August 1899 to deepen and improve over the bar at entrance to 14 feet and in the harbour to 12 feet L.W.S.T. The work was carried on from that date to the 20th December 1899 and then the plant wintered. Work was resumed in the spring, April 22 and concluded 31st May, 1900.

During this time 23,520 cubic yards of mud, stone and gravel were excavated and removed to deposit about  $\frac{1}{2}$  mile distant. Cost per cubic yard 0.39c. 56.

#### DREDGING AT MILTON, YARMOUTH CO. N. S.

Here some dredging by hand has been done from 18th to 30th June. The channel was deepened to 3 feet L.W.S.T. at the head of navigation in front

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F. H. Wilson & Co's wharfs. 343 cubic yards were removed Cost per cubic yard 0.72 c. 51.

At Milton there is a foundry, P. O. and stores and a population of about 1500.

## DREDGING AT PICTOU BAR, PICTOU COUNTY N. S.

This bar at the entrance of Pictou harbour N. S., received the attention of the department in August and September of 1899. The dredge "St. Lawrence" deepening over it to 19 feet L.W.S.T., removing mud and sand to a place of deposit 8 miles distant. 23,800 yards were excavated and much improvement made in the navigation of the locality. Cost per cubic yard 0.08 c. 12.

## DREDGING AT PICTOU LANDING, PICTOU COUNTY N. S.

On the south side of Pictou harbour and connected with the town of Pictou by ferry, is a terminal station of the I. C. Railway.

During the fiscal year ending 30th June 1900, the dredge "St. Lawrence" operated at the wharfs and approaches here for the Intercolonial Railway, deepening to 25 feet L. W. S. T. and removing 39200 cubic yards of mud, etc., which was deposited at a distance of ten miles.

The work was done in the month of July, September and October and was paid for by the I. C. Railway, cost per yard 0, 17.74c.

## DREDGING AT THE ACADIA COAL CO'S., WHARF PICTOU N. S.

In the vicinity of this wharf there was a lump or shoal which during September 1899 received the attention of the department, the dredge "St. Lawrence" deepening over it to 19 feet L. W. S. T. and removing 1750 cubic yards of mud, taking it to deposit a distance of 9 miles and giving a satisfactory improvement in the navigation of the locality and loading facilities for which the company paid the expense, cost per cubic yard 0.14c. 70.

## DREDGING AT YARMOUTH HARBOUR, YARMOUTH CO., N. S.

This important and growing seaport town has had the services of dredges for a number of years in carrying out a general plan of improvement of the harbour, channel and pier approaches.

The work of much importance and is being prosecuted vigorously.

During the present fiscal year the localities in this harbour, which were given the services of the dredge "Canada," were as follows :—

## BAKER'S WHARF, YARMOUTH, N. S.

Dredge "Canada" operated here 18th to 30th Sept. 1899 and 12th to 26th May 1900, deepening to 5 feet L.W.S.T. and removing mud and clay to a place

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of deposit about  $4\frac{1}{2}$  miles distant. Tides and weather interfered some with the dredging, 2,700 cubic yards were removed during the time stated, cost per cubic yard, 0.52.69.

#### CHANNEL TO STONEMAN'S AND LEWIS' WHARFS YARMOUTH.

Between 2nd September and 18th November, the periods alternating with other work at Yarmouth, the "Canada" operated in the channel from the main towards Lewis wharf including Stoneman's wharf, deepening to 4 feet L.W.S.T. and widening to 50 feet. The material, mud, etc., was removed to a deposit about  $4\frac{1}{2}$  miles and in the time stated, 9630 cubic yards were excavated, cost per yard, 0.41.73.

#### LAW'S WHARF, YARMOUTH, N. S.

Had services of "Canada" 17th to 24th October, deepening to 4 feet L. W. S. T. removing mud and shells to  $4\frac{1}{2}$  miles for deposit, 900 cubic yards were excavated, cost per yard, 0.45.04.

#### DREDGING AT DOMINION ATLANTIC RY. WHARF, YARMOUTH, N. S.

Dredging for the Dominion Atlantic Railway at Yarmouth, N. S., to form a turning basin for vessels opposite their piers and adjacent thereto was performed by dredge "Canada" at different times between 1st July and 31st October of the present fiscal year, removing in the aggregate in that time 17820 cubic yards mud, shells etc., to a distance of about  $4\frac{1}{2}$  miles and giving a depth of water opposite the wharfs of 16 feet L.W.S.T., cost per cubic yard, 0.28 c. 58.

#### YARMOUTH CHANNEL, YARMOUTH, N. S.

The dredging in the main channel, Yarmouth harbour, is extensive, important and much improving the navigation and berthing facilities of the locality. During the present fiscal year the dredge "Canada" was at work between 9th May and 30th June, less this time, intervening worked at Bakers', deepening to 16 feet and widening and straightening the channel, removing during the part of the season 9045 cubic yards of mud, shells etc. to a place of deposit about  $4\frac{1}{2}$  miles distant, cost per cubic yard 0.20 c. 04.

#### PRINCE EDWARD ISLAND.

##### THE P. E. I. RY. PIERS DREDGING CHARLOTTETOWN P. E. I.

During the present fiscal year, the piers of the P. E. I. Railway at Charlottetown, had attention as to the berths for vessels and approaches thereto, and the deepening and improving by dredging.

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The dredge "Province Edward" was employed from 1st July to 15th and from 23rd July to 9th August in making the depth to 25ft L. W. S. T. The material excavated was mud, sand and rock and deposited at a distance of  $1\frac{1}{4}$  mile. Some of the dredging was to but 22 and 16 feet for the inner 100 ft. stretch on account of ledge rock.

On the 9th August this work was finished, the further quantity of 6503 cubic yards having been removed cost per cubic yard 0,27,93.

## POOLE'S WHARF, CHARLOTTETOWN P. E. I.

An important wharf in the harbour of Charlottetown P. E. I. Dredging was done here by the "Prince Edward" in improving berths and approaches and deepening to 18 ft L. W. S. T. The material removed was mud, to a place of deposit  $1\frac{1}{4}$  mile distant 5805 cubic yards were removed, Payment to be made for this work by the proprietors of the wharf. Cost per cubic yards 0,05,50 exclusive of tug hire.

## FRENCH RIVER, NEW LONDON. P. E. I.

An inlet from New London Bay in Queens County P. E. I. The village has a population of about 150.

The dredge "Prince Edward" worked here in November and December 1899 and from 10th May to 30th June 1900 was continuing the work after the present fiscal year and had wintered at French River where what repairs necessary that could be done there were made, the channel of the river was deepened and improved to 10 ft L. W. S. T. During the year 25831 cubic yards were removed, principally mud and deposited at a distance of  $\frac{1}{4}$  to  $\frac{1}{2}$  mile, cost per cubic yard 0,25,53.

## MALPEQUE, PRINCE CO., P. E. I,

A seaport, post office, farming and fishing district, 16 miles from Summerside, with a population of about 500.

The dredge "Prince Edward" was here from 23rd August to 2nd November. The channel of the harbour was deepened to 10 feet L. W. S. T. making considerable improvement in the navigation. The material excavated was mud and clay, and deposited at a distance of about one mile. A total quantity of 28,575 cubic yards were excavated. Cost per cubic yard 0, 19,08.

## SUMMERSIDE, P. E. I.

The second town in importance in Prince Edward Island with an excellent harbour on the strait of Northumberland having a considerable export trade; steamship lines run here and a terminus of the P. E. I. Railway is here. In the harbour channel the dredge "St. Lawrence" was engaged in May and June, 1900, cutting through the sand and clay bar, and deepening to 20 feet L. W. S. T., making much improvement in the navigation. The work was still in progress at the end of the fiscal year when the quantity of 27,650 cubic yards had been removed and deposited 4 miles distant. Cost per cubic yard 0, 12c 12.

## NEW BRUNSWICK.

CHIPMAN, SALMON RIVER, QUEEN'S COUNTY, N. B. WARDS SHOAL AND  
CURLEY'S SHOAL.

These two shoals not far removed from each other, near Chipman, Salmon river. The Salmon river, an affluent of the Grand Lake is a water-way of considerable importance. The dredge "New Dominion" operated on this river deepening over the shoals named and improving the channel to 9 feet low water summer level.

*Ward's shoal*, from 1st July to 26th September, removing 34,750 of sand, rubbish and mud. The places of deposit varying a distance of from 200 yards to 2 miles.

*Curley's shoal*, 27th September to 23rd October, 1899, and 18th May to 30th June, 1900, removing 31,025 cubic yards of sand, mud, etc., taken a distance of from 200 yards to 2 miles, to deposit. A depth of 9 feet low water summer level was left over these shoals. Cost per cubic yard of dredging 0, 13c. 99 Wards and 0, 15c. 02 for Curley's shoals.

## JEMSEG, QUEEN'S COUNTY, N. B.

An affluent of the St. John river from Grand Lake. There is considerable traffic on the Jemseg and a large amount of produce shipped from the settlements on its banks. Steamers call at Upper and Lower Jemseg villages.

The dredge "New Dominion" was here this year from 24th October to 11th November 1899, deepening and improving the channel to 10 feet low water summer level. The spoil was sand and deposited 2 miles distant. 3,600 cubic yards were excavated. Cost per cubic yard, 0,32c. 25.

## OX ISLAND SHOAL, ST. JOHN RIVER, SUNBURY CO., N. B.

This shoal has been partly removed to 10 feet low water summer level by the clam shell dredge. The work was from 27th October to 12th November, when the ice forming in river necessitated its abandonment, 4,340 cubic yards of sand were removed to a distance of  $\frac{1}{2}$  mile for deposit. Cost per cubic yard 0,23c. 63.

## ROBINSON'S BAR, ST. JOHN RIVER, N. B.

A shoal near Fredericton was operated on by the clam shell dredge from 1st September to 26th October. The material, hard, compact clay and gravel made the work slow for this dredge. The distance to place of deposit, 250 yards. The depth given was 6 feet low water summer level. Work completed by the removal of 6,065 cubic yards in the time mentioned. Much improvement made in the navigation of this part of the river. Cost per cubic yard 0,39c. 52.



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## SPRINGHILL, YORK COUNTY, ST. JOHN RIVER, N. B.

Some six miles above Fredericton, on the St. John River in the vicinity of Springhill are found a number of shoals which have the attention of the department for the deepening over and the improvement of the course of river navigation. The clam shell dredge has operated at these for parts of two seasons. This year from 1st July to 31st August 1899, and 18th May to 30th June 1900 works still in progress. The depth required is to  $3\frac{1}{2}$  feet low water summer level, the work is very difficult and in a manner dangerous. The swift running water and great quantity of logs and rafts to guard against.

It is, however, being pushed persistently, and 14,920 cubic yards were removed this year. The material packed sand and gravel with silt is taken to deposit about  $\frac{1}{2}$  mile. During the spring freshets a reversed difficulty is found in the extra height of water for this dredge to work. Springhill work cost 0,35c. 38 per cubic yard.

## ST. JOHN, N. B. HARBOUR, WINTER PORT BERTHS.

The most extensive and important shipping piers and berths at West St. John have had considerable work done by the department thereat in the way of dredging.

During the present fiscal year from 1st July to 17th November, and from 2nd to 30th June, the dredge "Cape Breton" prosecuted the work as vigorously as the conditions would permit. The dedging was done as the tides served, but a short time each day, and the material was difficult, mud, clay, logs, boulders, ballast, etc. The depth was to 28 feet L. W. S. T. Detentions were caused by steamers in the way, boulders and bad weather.

Up to 30th June 1900 of this year 80,335 cubic yards had been removed. The place of deposit about 2 miles away. Work was in progress at end of year. Cost per cubic yard 0,10c. 74, exclusive of towage which was provided by the city.

## DREDGING—MARITIME PROVINCES.

CLASSIFICATION OF DISBURSEMENTS of the Dredges operated by the Public Works Department during the year ended

June 30, 1900.

DREDGE "ST. LAWRENCE"

Items.	July	August	September	October	November	December	January	February	March	April	May	June	Grand Total
	¢	cts.	¢	cts.	¢	cts.	¢	cts.	¢	cts.	¢	cts.	¢
Wages.....	483 33	483 33	478 56	483 33	483 33	483 33	245 22	262 33	271 33	746 86	483 33	482 61	5,386 89
Coal.....	96 60	193 20	234 60	82 80	110 40	138 13	.....	.....	.....	175 50	228 65	297 57	1,557 45
Provisions.....	165 11	166 98	134 43	51 81	139 76	72 28	.....	.....	.....	90 36	94 01	98 01	865 75
Stores.....	10 85	39 12	19 65	40 55	7 81	.....	24 16	9 10	.....	181 51	142 04	1 84	476 63
Equipment.....	119 29	116 78	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	236 07
Water.....	11 50	.....	14 50	16 00	.....	8 75	.....	.....	.....	22 75	1 56	2 10	77 16
Repairs.....	.....	60 92	.....	332 28	16 65	.....	.....	.....	.....	1,470 18	1,033 60	804 82	3,778 45
Pilotage.....	62 50	62 50	70 00	65 00	92 00	45 00	.....	.....	.....	55 00	78 00	78 00	588 00
Towage.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wharfage.....	60 00	5 57	.....	18 65	.....	8 19	10 90	.....	.....	.....	22 25	21 37	43 62
Contingencies.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	24 53	128 70
Totals.....	949 18	1,071 40	951 74	1,090 42	849 95	755 68	280 28	271 43	271 33	2,723 02	2,083 44	1,870 85	13,168 72
Working Expenses.....	949 18	1,010 48	951 74	758 14	833 30	755 68	335 06	.....	271 33	1,252 84	1,049 84	1,006 03	8,873 62
Repairs, ordinary.....	.....	60 92	.....	103 60	16 65	.....	.....	.....	.....	154 05	563 21	804 82	1,763 25
D. V. Repairs and wintering.....	.....	.....	.....	228 68	.....	.....	245 22	271 43	.....	1,316 13	470 39	.....	2,531 85
Total.....	949 18	1,071 40	951 74	1,090 42	849 95	755 68	280 28	271 43	271 33	2,723 02	2,083 44	1,870 85	13,168 72

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## DREDGE "CANADA"

Wages.....	399 94	406 63	403 00	403 48	394 85	403 00	351 83	195 00	265 64	239 75	407 90	420 00	4,290 90
Coal.....	187 90	293 61	184 19	148 42	147 91	186 06	.....	.....	.....	.....	198 25	216 81	1,503 22
Provisions.....	95 06	78 29	88 88	90 82	80 85	122 77	50 94	.....	.....	9 11	86 17	79 75	788 64
Stores.....	39 16	15 35	10 21	36 93	14 15	47 85	31 03	6 49	.....	15 30	100 71	105 81	513 02
Equipment.....	91 44	74 80	15 15	183 16	18 36	.....	.....	.....	.....	.....	176 20	.....	559 41
Water.....	6 00	4 86	6 30	.....	14 22	6 05	.....	.....	.....	.....	10 80	11 88	60 11
Repairs.....	115 70	.....	.....	160 67	139 47	45 10	47 20	65 50	7 32	212 94	865 25	2,846 03	4,502 18
Pilotage.....	52 00	54 00	34 00	.....	20 00	52 00	.....	.....	.....	.....	40 00	52 00	304 00
Towage.....	10 00	.....	.....	.....	.....	.....	100 00	.....	.....	.....	.....	.....	120 00
Wharfage.....	70 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	70 00
Contingencies.....	1 79	1 19	33 71	5 87	2 04	9 22	5 45	1 19	3 03	7 91	9 58	2 12	85 10
Total.....	1,009 05	838 73	805 47	1,020 35	835 05	872 05	596 45	268 18	275 99	485 01	1,954 94	3,704 40	12,794 67

Working expenses, Repairs, ordinary.. D. V. repairs and winding.....	953 35	838 73	805 47	808 08	698 58	826 05	549 25	7 68	208 67	272 07	1,080 69	918 37	8,097 49
	115 70	.....	.....	105 96	.....	45 10	.....	10 00	7 32	149 46	865 25	2,846 03	4,144 82
	.....	.....	.....	54 71	130 47	.....	47 20	250 50	.....	63 48	.....	.....	552 36
Total.....	1,009 05	838 73	805 47	1,020 35	835 05	872 05	596 45	268 18	275 99	485 01	1,954 94	3,704 40	12,794 67

## DREDGING—MARITIME PROVINCES.—Continued.

CLASSIFICATION OF DISBURSEMENTS of the Dredges operated by the Public Works Department during the year ended  
June 30, 1900.

## DREDGE "NEW DOMINION"

Items.	July	August	September	October	November	December	January	February	March	April	May	June	Grand Totals
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Wages.....	370 00	378 40	370 00	380 03	311 84	103 32	107 75	225 00	520 30	914 52	305 81	382 33	4,378 39
Coal.....	.....	110 25	.....	27 31	.....	.....	.....	.....	.....	.....	220 30	28 65	386 51
Provisions.....	71 71	61 17	3 00	51 00	92 28	1 75	.....	.....	.....	.....	123 47	.....	404 38
Stores.....	.....	.....	.....	13 50	13 50	.....	.....	.....	.....	16 30	63 61	171 30	264 71
Equipment.....	.....	.....	.....	3 00	3 00	.....	.....	.....	.....	.....	51 00	.....	71 75
Water.....	.....	.....	.....	5 50	5 50	.....	.....	.....	.....	.....	.....	.....	192 20
Repairs.....	.....	2 20	5 25	2 75	77 68	.....	15 98	120 01	230 26	.....	1,000 13	.....	1,544 26
Pilotage.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Towage.....	337 50	300 00	300 00	300 00	446 95	.....	.....	.....	.....	.....	330 00	520 00	2,174 45
Wharfage.....	30 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	30 00
Contingencies.....	.....	.....	.....	.....	17 35	7 29	.....	.....	.....	.....	.....	6 09	30 73
Total.....	809 21	942 02	738 25	851 09	908 10	112 36	123 73	345 01	759 65	930 82	2,184 32	1,513 01	10,077 57
Working Expenses.....	809 21	942 02	738 00	848 34	890 42	112 36	.....	.....	529 29	930 82	1,004 19	1,126 12	8,015 87
Repairs, ordinary.....	.....	.....	5 25	2 75	24 91	.....	15 98	9 98	.....	.....	1,000 13	186 89	1,335 89
D. V. repairs and wintering.....	.....	.....	.....	.....	52 77	.....	107 75	335 03	230 26	.....	.....	.....	725 81
Total.....	809 21	942 02	738 25	851 09	908 10	112 36	123 73	345 01	759 65	930 82	2,184 32	1,513 01	10,077 57

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## DREDGE "PRINCE EDWARD"

Wages.....	377 75	380 32	389 25	386 50	366 50	254 70	147 50	150 78	169 58	183 60	362 19	377 50	3,495 06
Coal.....	.....	87 07	.....	242 87	.....	.....	147 93	.....	.....	128 23	264 00	1 87	871 97
Provisions.....	.....	157 41	.....	80 70	116 67	85 60	58 21	.....	.....	3 04	9 02	190 88	681 53
Stores.....	1 00	95 48	.....	101 93	.....	14 41	29 05	.....	.....	.....	15 93	.....	248 89
Equipment.....	4 44	.....	.....	111 83	.....	.....	45 90	.....	.....	.....	3 50	.....	165 67
Water.....	25 00	27 88	25 00	83 06	56 92	12 86	.....	.....	.....	.....	23 44	25 00	279 16
Repairs.....	95 68	95 68	.....	55 67	9 64	34 98	.....	21 25	297 23	76 18	103 40	1,114 44	1,898 47
Blotage.....	.....	3 00	.....	8 00	8 00	13 50	.....	.....	.....	.....	.....	.....	32 59
Towage.....	475 00	1,146 87	.....	637 50	2,155 50	200 00	.....	.....	.....	.....	432 50	650 00	5,697 37
Wharfage.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Contingencies.....	.....	12 69	.....	3 00	8 37	41 25	10 63	.....	.....	5 50	4 32	8 76	94 52
Total.....	883 19	1,995 40	394 25	1,448 19	2,964 47	657 30	410 22	172 03	466 61	386 64	1,218 30	2,368 45	13,375 05
Working expense, Repairs, ordinary, D. V. Repairs and wintering.....	883 19	1,899 72	394 25	1,392 52	2,954 83	622 32	267 72	.....	169 58	320 46	1,114 90	1,254 01	11,273 30
	.....	95 68	.....	12 55	9 64	34 98	.....	.....	.....	53 75	103 40	1,114 44	1,404 44
	.....	.....	.....	43 12	.....	.....	142 50	172 03	297 23	42 43	.....	.....	697 31
Total.....	883 19	1,995 40	394 25	1,448 19	2,964 47	657 30	410 22	172 03	466 61	386 64	1,218 30	2,368 45	13,375 05

## DREDGING.—MARITIME PROVINCES.

CLASSIFICATION OF DISBURSEMENTS OF Dredges operated by Public Works Department, &c., during the year ended 30th June 1900.

DREDGE "GEO. MCKENZIE."

Items.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	Grand Total.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Wages.....	381 50	858 00	381 50	381 50	379 51	317 87	146 57	140 32	452 13	504 13	383 90	375 88	4,702 81
Coal.....	27 60	9 00	50	104 20	1 00	.....	.....	.....	.....	.....	36 00	277 50	455 80
Provisions.....	43 10	115 69	69 63	67 54	63 08	41 81	.....	.....	15 00	9 54	175 42	51 98	652 79
Stores.....	.....	2 83	5 08	3 45	25 28	10 00	.....	.....	.....	25 29	25 03	.....	97 05
Equipment.....	6 90	.....	47 35	.....	.....	.....	.....	.....	27 30	.....	49 14	.....	130 09
Water.....	54 50	133 00	78 00	78 00	78 00	57 00	4 40	57 37	102 24	54 39	66 00	63 00	533 50
Repairs.....	.....	29 02	13 35	187 23	.....	.....	.....	.....	.....	.....	380 71	.....	784 31
Pilotage.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,100 00	650 00	5,000 25
Towage.....	125 00	825 00	650 00	650 00	655 00	435 35	.....	.....	.....	.....	.....	.....	25 00
Wharfage.....	.....	25 00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Contingencies.....	16 31	31 46	1 65	3 80	7 13	25 29	1 00	.....	59 77	1 60	10 15	11 97	170 13
Total.....	600 41	1,950 50	1,254 71	1,523 07	1,209 00	887 41	151 57	197 69	656 44	574 95	2,206 35	1,430 33	12,642 43
Working Expenses	600 41	1,921 48	1,241 36	1,335 84	1,200 00	887 41	9 07	51 37	467 13	330 68	1,845 64	1,430 33	11,329 72
Repairs, ordinary.....	.....	29 02	13 35	.....	.....	.....	.....	.....	.....	34 39	340 71	.....	437 47
D. V. repairs and wintering.....	.....	.....	.....	187 23	.....	.....	142 50	146 32	189 31	269 88	.....	.....	875 24
Total.....	600 41	1,950 50	1,254 71	1,523 07	1,209 00	887 41	151 57	197 69	656 44	574 95	2,206 35	1,430 33	12,642 43

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## DREDGE "CAPE BRIOTON."

Wages .....	438 93	445 31	444 16	442 37	410 00	297 65	180 00	410 71	282 07	415 04	424 22	435 00	4 025 46
Coal .....	92 05	131 25	.....	90 93	115 30	.....	.....	.....	.....	.....	.....	161 33	600 06
Provisions .....	95 38	75 05	74 96	98 26	108 29	50 91	.....	2 00	9 63	.....	30 39	84 17	629 04
Stores .....	.....	46 83	1 45	.....	10 30	15 14	.....	2 68	.....	.....	171 43	34 77	282 00
Equipment .....	10 79	.....	.....	115 38	.....	15 45	.....	.....	105 00	.....	.....	348 13	594 75
Water .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	44 00	44 00
Repairs .....	263 30	53 53	.....	137 81	5 11	.....	23 08	90 53	314 47	153 26	61 97	222 90	1,325 36
Pilotage .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Towage .....	.....	2 50	.....	14 00	.....	.....	.....	.....	6 00	.....	6 00	.....	28 50
Wharfage .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Contingencies .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	4 50	7 17
Total .....	900 45	754 47	520 57	863 75	663 20	381 82	263 08	505 92	717 17	568 30	663 41	1,334 80	8,136 94
Working expenses, Repairs, ordinary .....	900 45	700 94	520 57	755 94	658 09	381 82	.....	4 68	291 70	415 04	632 04	1,111 90	6,373 17
D. V. repairs and wintering .....	.....	53 53	.....	137 81	5 11	.....	.....	.....	.....	56 80	56 37	992 90	532 52
Total .....	900 45	754 47	520 57	863 75	663 20	381 82	263 08	505 92	717 17	568 30	663 41	1,334 80	8,136 94

## DREDGING—MARITIME PROVINCES.

CLASSIFICATION OF DISBURSEMENTS of the Dredges operated by the Public Works Department during the Year ended  
June 30, 1900.

## DREDGE "CLAM SHELL."

Items.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	Grand Total.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Wages .....	471 43	480 73	447 72	520 80	363 02	64 11	60 00	73 15	100 00	220 65	243 85	577 38	3,571 43
Coal .....	122 36	163 57	61 66	78 75	.....	.....	.....	.....	.....	.....	119 77	80 75	926 86
Provisions .....	288 11	212 65	222 44	228 44	125 40	4 80	.....	.....	68 81	.....	68 81	214 95	1,365 00
Stores .....	.....	102 30	.....	.....	49 17	2 50	.....	.....	.....	.....	38 79	7 20	199 96
Equipment .....	.....	28 55	12 15	16 00	15 72	.....	.....	.....	.....	.....	.....	81 42	153 84
Water .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6 00	6 00
Repairs .....	46 96	149 51	54 04	.....	180 90	24 61	15 10	.....	20 70	186 75	734 01	118 84	1,531 51
Pilotage .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	135 00	.....	886 12
Towage .....	220 00	167 00	220 00	.....	144 12	.....	30 00	.....	.....	.....	.....	30 00	30 00
Wharfage .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Contingencies .....	.....	.....	.....	.....	9 43	.....	.....	.....	.....	.....	.....	25 54	35 47
Total .....	1,148 86	1,312 71	1,018 01	844 08	828 35	96 02	105 10	73 15	120 70	407 40	1,340 23	1,112 08	8,406 09
Working Expenses .....	1,101 90	1,163 20	963 97	844 08	647 36	71 41	30 00	.....	100 00	220 65	600 22	963 24	6,742 43
Repairs, Ordinary .....	46 96	149 51	54 04	.....	84 39	24 61	8 00	.....	.....	58 03	734 01	118 84	1,279 20
D. V. Repairs and Wintering .....	.....	.....	.....	.....	96 00	.....	67 10	73 15	20 70	127 82	.....	.....	385 37
Total .....	1,148 86	1,312 71	1,018 01	844 08	828 35	96 02	105 10	73 15	120 70	407 40	1,340 23	1,112 08	8,406 09

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EDGING MARITIME—PROVINCES—Continued.  
 CLASSIFICATION AND QUANTITIES of Material removed by Dredges operated by the Public Works Department, during the  
 Year ended June 30, 1900.

## DREDGE "ST. LAWRENCE."

Description of Material Dredged.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	Grand Total.
Hard-pan													
Boulders, stone and tin.					5 25								5 25
Gravel					24 50	9 00							33 50
Clay and boulders											136 50	140 00	276 50
Clay and sand		66 50											66 50
Sand—ordinary		129 50	42 00										171 50
Sand and mud			77 00	164 50		40 00							449 50
Mud	168 00												
Total	168 00	196 00	119 00	164 50	29 75	49 00					136 50	140 00	1,002 75

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## DREDGE "CANADA."

Hard-pan					3 60								3 60
Boulders													
Gravel											3 75		3 75
Clay			1 80										1 80
Clay and mud				20 00		20 70					20 00		60 70
Sand—ordinary													
Mud					30 60								30 60
Mud and shells	61 20	76 50	55 80	22 30							10 00	74 70	300 50
Total	61 20	76 50	57 00	42 30	34 20	20 70					33 75	74 70	400 95



DREDGING—MARITIME PROVINCES.—*Continued.*  
 CLASSIFICATION OF DISBURSEMENTS of the Dredges operated by the Public Works Department during the Year ended  
 June 30, 1900.

DREDGE "GEO. MCKENZIE."

Items.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	Grand Total.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Hard-pan .....	7,565	3,555				1,995				685	1,110		14,910
Boulders .....													
Gravel, sand and stone .....			925		740							4,895	6,540
Clay and stone .....				350	1,500								1,850
Mud and stone .....		1,545	5,000	3,675							495		10,715
Sand—ordinary .....													
Sand—very fine .....				3,185	1,750								4,935
Mud .....													
Total .....	7,565	5,100	5,925	7,210	3,990	1,995				685	1,605	4,895	38,970

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[illegible]

## DREDGE "CLAM SHELL."

Hard-pan.....							
Boulders.....	4,770	2,385				490	4,340
Gravel.....							11,985
Clay, sand and gravel.....			3,835	2,200			6,035
Clay and stone.....							
Sand, gravel, mud and sticks.....		2,935		945	3,325		2,935
Sand.....				1,000			4,270
Mud.....							1,000
Total.....	4,770	5,320	3,835	4,145	3,325	490	26,225

DREDGING BY HAND AT MILTON, VERMOUTH CO., N. S.



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Poole's Whf., Charlottetown, P.E.I.	July 16 to 22 & Aug. 9 to 12 '90	85	5,845	204 00	0 03 51	115 35	319 35	0 05 50
Malpeque, Prince Co., P.E.I.	Aug. 23 to Nov. 2 1890	444	28,575	3,483 32	0 12 18	1,968 96	5,452 28	0 19 08
French River, Prince Co., P.E.I.	Nov. 10 to Dec. 8 '90 & May 10 to June 30 1900	409	25,831	4,213 98	0 16 31	2,381 97	6,505 95	0 25 53
Geo. McKenzie								
Grand Etangs, Inverness Co., C.B.	July 1 to Aug. 13 1890	264	10,555	1,605 75				
Harbor au Bouche Antigonish Co., P. S.	Aug. 18 to Dec. 20 1890 & April 22 to May 31 1900	633	23,520	7,174 55	0 30 50	503 56	2,199 31	0 20 43
Cook's Cove, Guysboro Co., N.S.	June 5 to 30 1900	111	4,895	1,467 39	0 29 47	2,130 32	9,305 07	0 39 56
Cape Breton						435 76	1,903 15	0 38 47
St. John Winter berths, St. John Co., N.B.	July 1 to Nov. 17 '90 & June 2 to 30 1900	551	80,335	3,430 78	0 04 27*	5,198 00	8,629 38	0 10 74
Clam Shell								
Springhill, St. John River, York Co., N.B.	July 1 to Aug. 31 '90 & May 18 to June 30 1900	630	14,920	3,293 12	0 22 07	1,985 93	5,279 05	0 35 38
Robinson's Bar., St. John river, York Co., N.B.	Sept. 1 to Oct. 26 1890	385	6,965	1,717 16	0 24 65	1,055 54	2,752 70	0 39 58
Ox Island, Sunbury, Co., N.B.	Oct. 27 to Nov. 12 '90	94	4,340	551 31	0 12 61	332 47	883 78	0 23 63
Total		6184	341,654	47,258 61	0 12 85	36,000 80	83,359 4	0 24 39
Hand dredging, Milton, Yarmouth Co., N.S.	June 18 to 30 1900		343	248 71	0 72 51		248 71	
Total							83,608 12	

\*No towage included, provided by the city.

DREDGING—MARITIME PROVINCES—Continued.

EXPENDITURE FOR DREDGING in Nova Scotia for the twenty-eight Years ended June 30, 1900.

County	Locality	Total for the twenty-seven Years ended June 30, 1899.				For the Year 1899-1900.				Total Quantity	Total Cost for each County	
		Quantity		Cost		Quantity		Cost			Total Cost County	
		c. yds.	\$ cts.	\$ cts.	c. yds.	c. yds.	\$ cts.	\$ cts.				
Antigonish	Antigonish.....	22,025	3,649 15						22,025	3,649 15		
	Ha. hor au Bouche.....	35,723	10,388 26						36,243	10,763 33		
	Tracadie.....	12,245	5,330 29		23,520		9,305 07		12,245	5,330 29		
	McNairs's Cove.....	11,265	10,035 68						11,265	10,035 68		
	Bayfield.....	12,871	9,305 79						12,871	9,305 79		
	Arisaig.....	8,230	7,452 26	46,571 43			9,305 07		8,230	7,452 26	55,876 50	
Annapolis	Annapolis.....	2,825	1,635 68	1,635 68					2,825	1,635 68	1,635 68	
	Lingan.....	22,267	9,275 56						22,267	9,275 56		
Cape Breton	Sydney.....	54,600	17,781 54						54,600	17,781 54		
	Little Glace Bay.....	46,450	16,936 02						46,450	16,936 02		
	Port Caledonia.....	17,413	8,242 21						17,413	8,242 21		
	Benecadie Pond.....	20,800	5,093 90						20,800	5,093 90		
	Christmas Island.....	19,045	3,364 98						19,045	3,364 98		
	Tow Bay.....	3,255	1,892 32						3,255	1,892 32		
Colchester	Main à Dieu.....	4,680	2,720 76	66,207 29					4,680	2,720 76	66,207 29	
	Tatamagouche.....	65,480	20,373 07	20,373 07					65,480	20,373 07	20,373 07	
Cumberland	Parrishoro'.....	42,505	12,804 68						42,505	12,804 68		
	Wallace.....	93,865	24,140 37	36,945 05					93,865	24,140 37	36,945 05	
Digby	Digby.....	12,585	5,056 29						12,585	5,056 29		
	Weymouth.....	88	28 62	5,084 91					88	28 62	5,084 91	
Guysboro	Guysboro.....	5,400	1,413 53						5,400	1,413 53		
	Larry's River.....	47,655	16,519 85						47,655	16,519 85		

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Port Mulgrave.....	4,347	2,494 81	.....	4,347	2,494 81	.....
Sherbrooke.....	1,260	496 49	.....	1,260	496 49	.....
Cook's Cove.....	.....	.....	4,805	1,903 15	1,903 15	22,827 83
<b>Halifax.....</b>	<b>3,920</b>	<b>2,593 71</b>	<b>.....</b>	<b>3,920</b>	<b>2,593 71</b>	<b>.....</b>
Chezetcook.....	6,177	2,063 38	.....	6,177	2,063 38	.....
Halifax Ferry.....	26,101	12,049 68	.....	26,101	12,049 68	.....
Herring Cove.....	4,227	1,690 53	.....	4,227	1,690 53	.....
Ketch Harbour.....	792	182 53	.....	792	182 53	.....
Richmond Wharf.....	1,750	620 28	.....	1,750	620 28	.....
Roche's Wharf.....	27,690	8,415 51	.....	27,690	8,415 51	.....
Halifax Railway, terminus	21,515	4,958 56	.....	21,515	4,958 56	.....
Jaldore.....	7,350	2,970 39	.....	7,350	2,970 39	.....
North-West Arm.....	1,400	530 04	.....	1,400	530 04	.....
Cunard's Wharf.....	14,288	5,962 93	.....	14,288	5,962 93	.....
Salmon River.....	10,065	3,075 72	.....	10,065	3,075 72	.....
Spry Bay.....	2,070	596 97	.....	2,070	596 97	.....
Eastern Passage.....	4,815	1,388 61	47,008 84	4,815	1,388 61	49,740 12
Sambro.....	.....	.....	2,641 28	.....	.....	.....
<b>Inverness.....</b>	<b>19,760</b>	<b>3,491 31</b>	<b>.....</b>	<b>19,760</b>	<b>3,491 31</b>	<b>.....</b>
Whycocomagh.....	4,940	872 83	.....	4,940	872 83	.....
Campbell's Pond.....	270	190 37	.....	270	190 37	.....
Port Hastings.....	170,740	52,863 40	.....	170,740	52,863 40	.....
Cheticamp.....	128,347	49,126 92	.....	128,347	49,126 92	.....
Maillon.....	7,153	3,619 81	.....	7,153	3,619 81	.....
Port Hood.....	425	1,231 94	111,886 58	425	1,231 94	111,886 58
Grand Etang.....	.....	.....	10,555	2,190 31	2,190 31	.....
<b>Lunenburg.....</b>	<b>70,510</b>	<b>22,194 57</b>	<b>.....</b>	<b>70,510</b>	<b>22,194 57</b>	<b>.....</b>
Lunenburg.....	21,884	5,958 65	.....	21,884	5,958 65	.....
Malone Bay.....	11,610	5,075 53	33,228 75	11,610	5,075 53	33,228 75
Vogler's Cove.....	.....	.....	.....	.....	.....	.....
<b>Pictou.....</b>	<b>12,310</b>	<b>4,003 81</b>	<b>1,750</b>	<b>12,310</b>	<b>4,003 81</b>	<b>.....</b>
Acadia Coal Co., Wharf.....	9,475	2,181 25	.....	9,475	2,181 25	.....
Albion Mines.....	114,407	47,696 43	.....	114,407	47,696 43	.....
East River.....	1,650	359 90	.....	1,650	359 90	.....
Halifax Coal Co., Wharf.....	7,020	1,634 82	.....	7,020	1,634 82	.....
Pictou Public Wharf.....	78,250	21,687 04	.....	78,250	21,687 04	.....
Market Wharf.....	51,414	12,907 08	.....	51,414	12,907 08	.....
Railway Wharf.....	9,445	3,117 59	39,200	5,780 81	5,780 81	.....
Landing Wharf.....	720	246 18	.....	720	246 18	.....
Steam Ferry Co. ship	.....	.....	25,800	1,932 73	1,932 73	.....
Bar.....	.....	.....	.....	.....	.....	.....
Vale Colliery.....	1,395	682 15	.....	1,395	682 15	.....
River John.....	85,173	22,243 98	.....	85,173	22,243 98	.....
Granton.....	25,110	10,707 39	.....	25,110	10,707 39	.....
New Glasgow.....	35,445	11,795 79	.....	35,445	11,795 79	.....

DREDGING—MARITIME PROVINCES—*Continued.*

EXPENDITURE FOR DREDGING in Nova Scotia for the twenty-eight Years ended June 30, 1900.—*Continued.*

County	Locality	Total for the twenty-seven Years ended 30 June, 1899.				For the Year 1899-1900.				Total Quantity	Total Cost for each County		Total Cost County
		Quantity		Cost		Quantity		Cost			\$	cts.	
		c. yds.	\$	cts.	\$	c. yds.	\$	cts.	\$				
Pictou	Middle River	15,060	4,984	40						15,060	4,984	40	
	C. Dwyer's Wharf.	5,400	1,087	66						5,400	1,087	66	
	Berth for ss. <i>Campana</i>	5,850	2,000	22						5,850	2,000	22	
	Dwyer & Co's Wharf..	360	123	09	147,548	98		7,971	28	360	123	09	155,520
Queens	Liverpool	33,730	9,960	70						33,730	9,960	70	
	Port Mouston	10,620	2,283	77	12,244	47				10,620	2,283	77	12,244
Richmond.	D'Escousse	23,650	10,052	76						23,650	10,052	76	
	St. Peter's Canal.	90,830	27,435	95						90,830	27,435	95	
	St. Peters.	7,150	2,407	41						7,150	2,407	41	
	Grand Goulet.	23,584	5,570	49						23,584	5,570	49	
	River Bourgeois.	18,920	4,468	87						18,920	4,468	87	
	Marine slip	320	56	53						320	56	53	
	Poulemont	10,080	2,566	14						10,080	2,566	14	
	Toucheu Harbour.	16,875	9,454	94	62,013	09				16,875	9,454	94	62,013
Shelburne	Lockeport.	75,358	18,026	86						75,358	18,026	86	
	Barrington Passage	40,780	13,123	31						40,780	13,123	31	
	Oxborne.	990	145	31						990	145	31	
	Wood's Harbour.	1,170	245	45						1,170	245	45	
	Barrington Pass and Sherrow's Channel	9,090	1,074	02	32,614	95				9,090	1,074	02	32,614
Yarn outh.....	Yarmouth	323,587	86,091	30			40,065	13,569	13	383,682	99,660	43	
	Milton.						343	248	71	343	248	71	99,909
Yants	Windsor.	5,450	1,627	60						5,450	1,627	60	

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Victoria.....	Aspy Bay.....	3,820	1,509 95	1,509 95	3,820	1,509 95	1,509 95
Dredge "C. B." losses.....			762 98	762 98		762 98	762 98
		2,319,876	733,939 60	733,939 60	37,837 93	37,837 93	771,777 53
				152,033			

## DREDGING—MARITIME PROVINCES—Continued.

EXPENDITURE FOR DREDGING in Prince Edward Island for the twenty-eight Years ended June 30, 1900.

County.	Locality.	Total for the twenty-seven Years ended 30th June 1899.				For the Year 1899-1900.				Total		Cost for each County.
		Quantity.	Cost.	Cost for County.	Quantity.	Cost.	Cost for County.	Quantity.	Cost.	Quantity.	Total Cost.	
		c. yds.	\$	cts.	\$	cts.	\$	c. yds.	\$	c. yds.	\$	\$
Kings	Grand River.....	76,170	15,304	04				76,170	15,304	04		
	Montague River.....	132,480	22,819	11				132,480	22,819	11		
	Murray Harbor South.....	99,453	17,638	73				99,453	17,638	73		
	Sturgeon.....	16,026	6,006	27				16,026	6,006	27		
	St. Mary's wharf.....	21,963	4,752	55				21,963	4,752	55		
	Georgetown Railway wharf.....	1,002	408	32				1,002	408	32		
	Cardigan bridge.....	35,955	8,619	36				35,955	8,619	36		
	Newport.....	3,240	917	82				3,240	917	82		
	Souris.....	3,825	1,083	53	77,609	73		3,825	1,083	53	77,609	73
	Charlottetown Railway wharf.....	79,648	21,001	55				79,648	21,001	55		
Queen's	Pownal wharf.....	14,193	2,963	50				14,193	2,963	50		
	Perry.....	10,075	2,006	99				10,075	2,006	99		
	Steam Nav. Co.....	13,113	5,491	77				13,113	5,491	77		
	Connolly's wharf.....	9,978	4,409	68				9,978	4,409	68		
	Peake Bros.....	12,195	5,362	46				12,195	5,362	46		
	Queen Street slip.....	3,915	1,100	63				3,915	1,100	63		
	Geo. Peake's wharf.....	5,805	1,644	42				5,805	1,644	42		
	Poole's wharf.....	6,435	1,405	95				6,435	1,405	95		
	McMillan's.....	6,165	1,320	13				6,165	1,320	13		
	Dom. building sewer.....	5,355	1,146	68				5,355	1,146	68		
	Public sewerage.....	2,880	679	12				2,880	679	12		
	Webster's Corner, East River.....	203	43	47				203	43	47		
	Crapaud, Victoria.....	100,652	31,747	99				100,652	31,747	99		
	Pownal Bay.....	33,610	6,536	20				33,610	6,536	20		
	Rocky Point.....	82,920	13,426	13				82,920	13,426	13		
	Vernon River.....	17,800	6,326	72				17,800	6,326	72		
	Wood Islands.....	2,780	548	00				2,780	548	00		
	Nine Mile Creek.....	31,650	6,286	46				31,650	6,286	46		

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County.	Locality.	Quanty	Cost.	Cost for County.	Quanty	Cost.	Cost for County.	Total Quantity	Total Cost.	Cost for each County.
Hickey wharf		750	150 51		750	150 51				
Carr's Point		12,165	2,441 28		12,165	2,441 28				
Pinette		3,825	756 24		3,825	756 24				
Fort Augustus		3,195	631 68		3,195	631 68				
Southport Ferry		45,300	7,508 75		45,300	7,508 75				
Red Point		7,161	3,879 60		7,161	3,879 60				
North Rustico		13,536	4,775 38		13,536	4,775 38				
South Rustico		11,649	4,109 67		11,649	4,109 67				
Gauthiers Creek		17,847	8,305 50		17,847	8,305 50				
Malpeque					28,575	3,483 32				
French River					25,831	4,213 98				
Summerside		56,486	17,412 79		56,486	17,412 79				
Hurd's Point Pier		59,295	11,913 99		59,295	11,913 99				
Tignish		11,387	13,005 45		11,387	13,005 45				
Cascumpec		1,157	538 42		1,157	538 42				
Cape Traverse		16,740	5,105 89		16,740	5,105 89				
Holman's wharf		9,585	1,269 21		9,585	1,269 21				
		11086 24	272,870 34	272,870 34	94,364	10870 41	10,870 41	1 202 988	283,740 75	283,740 75

## EXPENDITURE FOR DREDGING in Quebec for the twenty-eight Years ended 30th June 1900.

From Appropriations, Maritime Provinces.

County.	Locality.	For the Year 1899-1900.				Total Quantity	Total Cost.	Cost for each County.
		Total for the twenty-seven Years ended 30th June 1899.		For the Year 1899-1900.				
		Quan'ty	Cost.	Cost for County.	Quan'ty	Cost.	Cost for County.	
		c. yds.	\$ cts.	\$ cts.	c. yds.	\$ cts.	\$ cts.	\$ cts.
Magdalen Islands, Co. Gaspé	House Harbour	6,800	2,392 92					
	Amherst Harbour	495	242 05	2,634 97				
	River du Loup	2,587	825 47	825 47				
	Rimouski	8,123	3,997 59	3,997 59				
		18,005	7,458 03	7,458 03				

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DREDGING MARITIME PROVINCES—Continued.

EXPENDITURE for Dredging in New Brunswick for the twenty-eight years ended 30th June, 1900.

County.	Locality.	For the twenty-seven years ended 30th June, 1899.			For the year 1899-1900.			Total quantity	Total cost.	Cost for each county.
		Qu'ntity Cub. yds.	Cost.		Qu'ntity Cub. yds.	Cost.				
			\$	cts.		\$	cts.			
Gloucester.	Bathurst.....	98,637	29,065	79	29,065	79	98,637	29,065	79	29,065 79
	Richibucto.....	140,228	44,001	19			140,228	44,001	19	
	Cocagne.....	27,180	9,601	45			27,180	9,601	45	
Kent	Buctouche.....	13,005	4,934	24			13,005	4,934	24	
	Priests' Point.....	3,510	1,110	70			3,510	1,110	70	
	Chapel Point.....	4,140	1,310	07			4,140	1,310	07	
King's	Robertson's wharf.....	45		14 23			45		14 23	
	Belleisle Point.....	60,170	8,156	76			60,170	8,156	76	
	Kennebecasis River.....	116,270	20,081	83			116,270	20,081	83	
Northumberland	Moss Glen.....	10,200	1,924	47			10,200	1,924	47	
	Horse Shoe.....	208,892	55,058	36			208,892	55,058	36	
	Miramichi.....	29,935	7,965	31			29,935	7,965	31	
Queen's	Outer Bar.....	37,975	10,121	67			37,975	10,121	67	
	Grand Dune.....	22,425	4,403	95			22,425	4,403	95	
	Gordon Flats.....	93,555	16,372	96			93,555	16,372	96	
Restigouche	Grand Lake.....	20,440	4,522	82			20,440	4,522	82	
	Dr. McManu's Cove.....	83,030	16,291	96			83,030	16,291	96	
	Jemseg.....	48,975	6,340	83			48,975	6,340	83	
St. John	Waashadenook.....	12,040	3,274	99			12,040	3,274	99	
	Grimross, Midground.....	33,590	5,968	99			33,590	5,968	99	
	Gagetown Creek Canal.....	3,000	402	51			3,000	402	51	
St. John	Spoon Island.....	6,175	1,174	49			6,175	1,174	49	
	Ward's shoal, Salmon Riv., Queen's Co.....									
	Curley's shoal.....									
St. John	Dalhousie.....	22,301	6,543	08			22,301	6,543	08	
	Traverse.....	110,810	21,415	93			110,810	21,415	93	
	I. C. Railway terminus.....	159,472	41,553	75			159,472	41,553	75	
St. John	Navy Island.....	25,294	9,296	79			25,294	9,296	79	
	Marble Cove.....	29,925	4,374	40			29,925	4,374	40	
	Murray's Mills.....	23,880	3,441	65			23,880	3,441	65	
St. John	Indiantown wharf.....	1,615	192	83			1,615	192	83	

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Long wharf	7,137	2,680 24	.....	7,137	2,680 24	.....
Miller & Woodman's	9,275	1,090 42	.....	9,275	1,090 42	.....
Hayward & Stetson	8,015	942 29	.....	8,015	942 29	.....
International wharf	450	52 90	.....	450	52 90	.....
Adams' wharf	7,513	3,247 29	.....	7,513	3,247 29	.....
Anchor Line wharf	4,695	996 81	.....	4,695	996 81	.....
Dominion Atlantic Railway wharf	15,325	4,484 72	.....	15,325	4,484 72	.....
St. John winter berths	240,213	37,526 13	.....	320,548	40,956 91	.....
Harbour channel	3,413	5,063 92	.....	3,413	5,063 92	.....
Purvis Murchie mill	675	142 57	.....	675	142 57	.....
McAvity wharf	2,640	270 98	.....	2,640	270 98	.....
Lawton's "	570	101 46	.....	570	101 46	.....
Thorne's "	1,980	249 02	.....	1,980	249 02	.....
Maritime Nail Co	1,425	224 52	.....	1,425	224 52	.....
Cushing's mill	20,850	1,222 86	.....	20,850	1,222 86	.....
Oromocto	287,873	55,775 79	.....	287,873	55,775 79	.....
McLean's wharf	625	181 59	.....	625	181 59	.....
Ox Island	.....	55,957 38	.....	.....	551 31	.....
Pointe du Chêne	27,599 90	27,599 90	.....	551 31	551 31	.....
Fredericton	92,925	19,651 33	.....	92,925	27,599 90	.....
St. Mary's Ferry	115,070	6,827 36	.....	115,070	19,651 33	.....
Gibson	15,570	4,379 52	.....	15,570	6,827 36	.....
Naashwaak	30,395	4,379 52	.....	30,395	4,379 52	.....
Fisher & Chestnut shoals	1,600	435 22	.....	1,600	435 22	.....
Canada Eastern Railway wharf	8,200	1,547 12	.....	8,200	1,547 12	.....
Springhill	3,250	938 82	.....	3,250	938 82	.....
Robinson's Bar	700	305 77	.....	15,620	3,508 89	.....
Clam shell dredge, equipment	.....	34,085 14	.....	6,965	1,717 16	.....
	.....	1,591 12	.....	.....	1,591 12	.....
Totals	2927298	516477 67	.....	2503253	531214 49	.....

Totals

STATEMENT of dredging showing quantities removed in each Province and cost of each work for the twenty-eight years ended  
30th June 1900.

FISCAL YEAR.	NEW BRUNSWICK.			NOVA SCOTIA.			QUEBEC.			PRINCE EDWARD ISLAND.			Quantity, Expenditure, Total.			Cost, Cubic Yard.		
	Quantity.		Cost.	Quantity.		Cost.	Quantity.		Cost.	Quantity.		Cost.	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.
	c. yds.	\$ cts.		c. yds.	\$ cts.		c. yds.	\$ cts.		c. yds.	\$ cts.							
1872-3.....	38,090	13,240 50	23,290	8,422 70	.....	.....	.....	.....	.....	.....	.....	.....	61,320	21,063 20	0 35-328	0 35-328	0 35-328	0 35-328
1873-4.....	57,725	14,295 57	18,600	6,545 61	.....	.....	6,800	2,392 92	.....	.....	.....	.....	83,125	23,354 10	0 28-071	0 28-071	0 28-071	0 28-071
1874-5.....	78,223	17,325 05	24,416	13,238 83	.....	.....	.....	.....	.....	.....	.....	.....	121,294	40,456 77	0 33-354	0 33-354	0 33-354	0 33-354
1875-6.....	79,995	17,000 52	91,974	21,885 90	.....	.....	.....	.....	.....	.....	.....	.....	230,192	49,818 22	0 21-642	0 21-642	0 21-642	0 21-642
1876-7.....	97,690	23,161 90	127,785	34,846 74	.....	.....	.....	.....	.....	.....	.....	.....	269,935	70,766 91	0 23-504	0 23-504	0 23-504	0 23-504
1877-8.....	81,070	23,323 92	106,857	29,007 94	.....	.....	.....	.....	.....	.....	.....	.....	270,787	64,943 04	0 23-083	0 23-083	0 23-083	0 23-083
1878-9.....	132,555	27,400 22	116,307	28,267 50	.....	.....	.....	.....	.....	.....	.....	.....	295,352	64,831 88	0 21-951	0 21-951	0 21-951	0 21-951
1879-80.....	63,540	16,581 79	127,684	34,765 84	.....	.....	.....	.....	.....	.....	.....	.....	228,379	64,386 69	0 28-197	0 28-197	0 28-197	0 28-197
1880-1.....	44,315	12,385 85	87,118	23,061 64	.....	.....	.....	.....	.....	.....	.....	.....	180,085	45,439 46	0 25-232	0 25-232	0 25-232	0 25-232
1881-2.....	79,040	18,026 87	80,506	33,363 71	.....	.....	.....	.....	.....	.....	.....	.....	216,531	61,347 15	0 28-331	0 28-331	0 28-331	0 28-331
1882-3.....	48,565	13,422 70	143,616	42,986 93	.....	.....	.....	.....	.....	.....	.....	.....	240,716	67,500 00	0 29-890	0 29-890	0 29-890	0 29-890
1883-4.....	47,058	17,103 38	157,560	49,030 58	.....	.....	.....	.....	.....	.....	.....	.....	284,368	79,579 01	0 27-959	0 27-959	0 27-959	0 27-959
1884-5.....	128,997	24,460 35	76,164	25,290 73	.....	.....	.....	.....	.....	.....	.....	.....	462,432	142,432	0 32-792	0 32-792	0 32-792	0 32-792
1885-6.....	68,505	14,874 63	56,790	21,482 05	.....	.....	.....	.....	.....	.....	.....	.....	128,977	43,288 79	0 33-56	0 33-56	0 33-56	0 33-56
1886-7.....	69,440	11,452 86	53,400	25,621 19	.....	.....	.....	.....	.....	.....	.....	.....	138,102	45,000 00	0 32-58	0 32-58	0 32-58	0 32-58
1887-8.....	50,152	9,252 50	84,175	29,847 60	.....	.....	.....	.....	.....	.....	.....	.....	144,783	44,798 03	0 27-20	0 27-20	0 27-20	0 27-20
1888-9.....	63,633	16,508 08	56,910	32,637 00	.....	.....	.....	.....	.....	.....	.....	.....	177,273	54,451 87	0 30-71	0 30-71	0 30-71	0 30-71
1889-90.....	86,008	20,544 93	50,783	29,821 55	.....	.....	.....	.....	.....	.....	.....	.....	188,398	69,757 27	0 32-249	0 32-249	0 32-249	0 32-249
1890-1.....	96,588	20,375 06	61,698	29,366 57	.....	.....	.....	.....	.....	.....	.....	.....	215,454	56,980 67	0 26-44	0 26-44	0 26-44	0 26-44
1891-2.....	75,023	20,592 85	81,993	27,376 08	.....	.....	.....	.....	.....	.....	.....	.....	198,622	62,498 50	0 31-46	0 31-46	0 31-46	0 31-46
1892-3.....	108,035	23,742 26	40,834	18,125 58	.....	.....	.....	.....	.....	.....	.....	.....	171,693	47,481 45	0 27-65	0 27-65	0 27-65	0 27-65
1893-4.....	77,505	21,564 27	59,581	28,664 99	.....	.....	.....	.....	.....	.....	.....	.....	339,788	67,068 94	0 19-73	0 19-73	0 19-73	0 19-73
1894-5.....	59,715	13,630 11	105,463	32,202 70	.....	.....	.....	.....	.....	.....	.....	.....	381,120	69,810 23	0 18-31	0 18-31	0 18-31	0 18-31
1895-6.....	98,905	21,352 63	36,428	15,828 80	.....	.....	.....	.....	.....	.....	.....	.....	51,040	13,283 71	0 33-228	0 33-228	0 33-228	0 33-228
1896-7.....	203,975	34,050 86	84,735	22,080 46	.....	.....	.....	.....	.....	.....	.....	.....	94,364	17,537 73	0 42-332	0 42-332	0 42-332	0 42-332
1897-8.....	187,325	21,611 17	147,085	31,497 57	.....	.....	.....	.....	.....	.....	.....	.....	1,202,988	290,408 07	6,153,553	1,601,680 21	0 25-87	0 25-87
1898-9.....	105,058	23,315 82	155,510	36,628 81	.....	.....	.....	.....	.....	.....	.....	.....	1,202,988	290,408 07	6,153,553	1,601,680 21	0 25-87	0 25-87
1899-1900.....	175,935	28,232 46	152,033	37,580 22	.....	.....	.....	.....	.....	.....	.....	.....	1,202,988	290,408 07	6,153,553	1,601,680 21	0 25-87	0 25-87
	2,502,225	5,45659 11	2,427,325	758,155 00	.....	.....	.....	.....	.....	.....	.....	.....	18,005	7,458 03	.....	.....	.....	.....



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STATEMENT of dredging showing quantities removed by hand in each Province and cost of such dredging for the twenty-eight years ended 30th June 1900.

FISCAL YEAR.	NOVA SCOTIA.		NEW BRUNSWICK.		QUEBEC.		PRINCE EDWARD ISLAND.		Total Quantity.	Total Expenditure.	Cost per Cubic Yard.
	Quantity.		Quantity.		Quantity.		Quantity.				
	c. yds.	\$ cts.	c. yds.	\$ cts.	c. yds.	\$ cts.	c. yds.	\$ cts.			
1878-9.....	.....	.....	245	555 13	.....	.....	.....	.....	245	555 13	2 26 58
1879-80.....	.....	.....	12,370	3,696 90	.....	.....	.....	.....	12,370	3,696 90	0 29 14
1880-1.....	.....	.....	11,140	2,560 25	.....	.....	.....	.....	11,140	2,560 25	0 22 98
1881-2.....	.....	.....	10,640	2,650 00	.....	.....	.....	.....	10,640	2,650 00	0 24 98
1882-3.....	.....	.....	8,190	2,500 00	.....	.....	.....	.....	8,190	2,500 00	0 30 52
1883-4.....	.....	.....	5,400	2,500 00	.....	.....	.....	.....	5,400	2,500 00	0 45 78
1884-1899.....	.....	.....	Nil.	Nil.	.....	.....	.....	.....	Nil.	Nil.	Nil.
1899-1900.....	.....	.....	343	248 71	.....	.....	.....	.....	343	248 71	0 72 51
.....	.....	.....	48,388	14,680 90	.....	.....	.....	.....	48,388	14,680 90	0 30 34

STATEMENT OF DREDGING in the Maritime Provinces, showing quantities removed by and expenditure of each dredge during the twenty-eight Years ended 30, June 1900.

Dredge.	Total quantities and cost for twenty-seven Years ending 30th June 1899.				Fiscal Year 1899-1900.				Total for twenty-eight Years ended 30th June 1900.			
	Total Quantity.	Total cost.	Cost per cubic yard.		Total Quantity.	Total cost.	Cost per cubic yard.		Total Quantity.	Total cost.	Cost per cubic yard.	
	c. yds.	\$ cts.	\$ cts.		c. yds.	\$ cts.	\$ cts.		c. yds.	\$ cts.	\$ cts.	
" St. Lawrence "	1,217,289	333,000 27	0 27 40		100,275	13,965 81	0 13 92		1,317,514	347,375 08	0 26 38	
" Canada "	826,219	201,170 50	0 31 01		40,065	13,569 13	0 33 84		866,314	274,739 63	0 31 58	
" New Dominion "	1,232,755	226,608 63	0 18 38		69,375	10,687 55	0 15 40		1,302,080	237,296 18	0 18 22	
" Prince Edward "	1,102,714	269,515 38	0 24 44		66,714	14,184 48	0 21 26		1,169,428	283,699 86	0 23 90	
(Old) " Cape Breton "	534,938	139,074 33	0 25 90		.....	.....	.....		534,938	139,074 33	0 25 90	
" Geo. McKenzie "	605,390	240,847 21	0 39 77		38,970	13,407 33	0 34 40		644,360	254,254 74	0 39 44	
" Cape Breton "	197,551	33,101 00	0 19 79		80,335	8,029 38	0 10 74		277,886	47,730 38	0 17 17	
" Clam Shell "	700	1,806 89	2 70 98		26,225	8,915 53	0 33 99		26,925	10,812 42	0 40 15	
	5,717,656	1,511,823 21	0 26 44		421,989	83,359 41	0 24 39		6,139,645	1,595,182 62	0 25 98	

Dredge.

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STATEMENT OF DREDGING performed by hand in the Maritime Provinces, showing quantities removed and expenditure at each locality for twenty-eight Years ended 30, June 1900.

Locality.	Total quantities and cost for twenty-seven Years ending 30th June 1899.				Fiscal Year 1899-1900.				Total for twenty-eight Years ended 30th June.			
	Total cost.		Cost per cubic yard.		Total cost.		Cost per cubic yard.		Total cost.		Cost per cubic yard.	
	Total Quantity.	c. yds.	\$ cts.	\$ cts.	Total Quantity.	c. yds.	\$ cts.	\$ cts.	Total Quantity.	c. yds.	\$ cts.	\$ cts.
Parrboro, N. S.	42,595	12,804 68	0 30 06	.....	.....	42,595	12,804 68	0 30 06	.....	42,595	12,804 68	0 30 06
Windsor, N. S.	5,450	1,627 60	0 29 86	.....	.....	5,450	1,627 60	0 29 86	.....	5,450	1,627 60	0 29 86
Milton, N. S.	.....	.....	.....	.....	343	248 71	0 72 51	.....	343	248 71	0 72 51	0 72 51
	48,045	14,432 28	0 30 03	.....	343	248 71	0 72 51	.....	48,388	14,080 99	0 30 34	.....

## PROVINCE OF QUEBEC.

## RIVER ST. LAWRENCE SHIP CHANNEL.

The River St. Lawrence Ship Channel between Montreal and Quebec, is 160 miles in length. Of this about 65 per cent is natural deep water not requiring any improvement.

Before the commencement of dredging operations the shallowest place was on the flats of Lake St Peter, where, at ordinary low water, the depth was  $10\frac{1}{2}$  feet.

In 1888 the Montreal Harbour Commissioners had completed and opened the Channel, from Montreal down to tide water, with a depth of  $27\frac{1}{2}$  feet at the same stage of low water.

Since 1889 the dredging operations have been conducted by this Department.

From 1889 until 1898 almost the whole of the dredged portion of the river, except the Channel in Lake St. Peter, was gone over. The bottom was scraped and cleaned; many curves and narrow places were widened, and in tide water, shoals were dredged, to avoid, as much as possible, the necessity of waiting for the tide.

The extraordinary low water of 1895 and 1897, and the increase in size of vessels, urgently called for a wider and deeper channel, and for this new, larger and more powerful dredges and plant were required.

In 1899 the dredging plant was in a position to warrant the commencement of a more extensive plan of operations. Two new elevator dredges of large type, with their tugs and plant had proved their efficiency. Two powerful steel dredges designed according to the best practice, and experience in this identical work, with their tugs &c., were almost completed; and two more, to complete the six required, were authorized.

With this dredging fleet, and the necessary repair shops and ship yard at Sorel available, and having in view the faults of the old channel, the type of steamships using it, and the necessity of work capable of immediate utility, the question of type of channel to give the best results was carefully considered.

The old channel depth was  $27\frac{1}{2}$  feet at the low water of ordinary years, but as will be seen from the attached table, this depth could not be relied on during occasions of extraordinary low water.

The lowest water in the  $27\frac{1}{2}$  foot channel on record, was 25 feet 10 inches, on November 1st 1895.

As the water on some future occasion may go even lower, it was decided to adopt for "Extreme Low Water" a river level 10 inches lower than that of November 1st 1895; or a low water corresponding to nearly 8 feet on the flats of Lake St. Peter.

As almost all accidents in the channel have been the result of vessels striking the edge of the bank, whether from pilots negligence, defect in steering-gear or otherwise, it was decided to make the improved channel as wide as could be dredged in one cut; and to straighten curves and lengthen tangents as much as economical considerations would permit.

It was considered advisable to immediately undertake the section from the limits of Montreal down to where the tide could be utilized; a length of about 100 miles in which there would be about 50 miles of dredging to be done.

In 1899 the new proposition was commenced.

In general this proposition may be stated to be the making of a channel from the eastern limit of Montreal Harbour down to tide water, 400 to 500 feet wide, and 29 feet deep at "extreme low water," together with a possible anchorage basin in Lake St. Peter.

*At the date of writing, the close of the season of 1900, a length of more than 10 miles out of the 50 is completed.*

The fifth new dredge is expected to be ready some time in 1901, and the sixth in 1902.

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With equal success, and operations conducted with the same vigour as in 1900, it is expected that this proposition will be completed in 5 or 6 more seasons.

In the meantime, although the shallowest place will govern the available depth: the wider, straighter and deeper channel will be, as completed, safer and easier of navigation.

The present ship channel between Montreal and Quebec has a minimum width of 300 feet, with the bends all at least 450 feet. The depth depends on the stage of river level. It is 27½ feet when the depth on the flats of Lake St. Peter is 10½ feet. The following table gives the average depths during navigation season since 1890:

RIVER ST. LAWRENCE SHIP CHANNEL.

TABLE showing depth of water between Montreal and Quebec.  
1890-1900.

Year.	Average depth for each month.							From Sorel gauge During each year. (May to Nov.)	
	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Highest.	Lowest.
	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.	ft. in.
1890.	35 6	35 3	31 9	30 6	30 9	29 9	30 6	37 0	29 0
1891.	34 6	31 3	29 9	29 9	30 0	28 3	28 3	36 9	27 3
1892.	31 0	31 9	31 6	30 6	28 9	28 3	28 3	33 6	27 3
1893.	36 0	34 3	30 9	29 9	29 6	28 6	28 0	37 6	27 6
1894.	34 6	31 9	31 0	29 0	28 3	28 9	29 0	36 0	27 7
1895.	33 3	31 3	28 3	28 3	27 6	26 9	26 9	34 6	25 10
1896.	33 6	30 6	28 9	28 0	27 6	27 9	29 0	37 0	27 4
1897.	35 6	32 6	30 3	29 3	28 0	27 0	27 6	37 0	26 9
1898.	31 6	30 9	29 8	28 6	28 2	28 3	28 6	32 1	26 9
1899.	36 0	31 9	30 3	28 6	27 6	28 0	27 9	37 9	26 9
1900.	33 6	30 9	30 6	29 6	28 1	28 9	29 2	35 9	27 4

DREDGING operations from July 1st 1899 to end of season 1900.

Locality	Description of Work.	Width.	Length of Channel dredged 1899 & 1900
Ile Ste. Thérèse	Widening and deepening	450 ft. 29' 0" E. L. W.	0.3 miles.
Varennes to Cap St. Michel	Widening and deepening	450 to	
Cap St. Michel to Ile Bellegard	Straightening, widening and deepening	500 ft. 29' 0" E. L. W.	3.0 "
Ile Bellegard to Verchères	Straightening, widening and deepening	450 ft. 29' 0" E. L. W.	1.4 "
Ile au Brauf	Straightening, widening and deepening	450 ft. 29' 0" E. L. W.	2.0 "
Ile de Grâce Channel	Straightening, widening and deepening	450 ft. 29' 0" E. L. W.	0.3 "
Stone Island	Widening and deepening	450 ft. 29' 0" E. L. W.	1.7 "
Three Rivers	Straightening, widening and deepening	450 ft. 29' 0" E. L. W.	1.1 "
Champlain and Pointe Citrouille	Cleaning up small sand bars	600 ft. 29' 0" E. L. W.	0.5 "
Cap Santé	Completion of new channel	— ft. 27' 6" O. L. W.	— "
Ste. Croix Bar	Completion ½ width new channel	500 ft. 29' 0" E. L. W.	0.2 "
Total length of dredging completed in 1899 and 1900			10.8 miles.
Estimated length of dredging between Montreal Harbour and Batiscan			50.0 "

NOTE.— "E. L. W." is 2.40 feet lower than old Ship Channel datum of 27½ foot channel.

During the season of navigation of 1900 the whole of the dredged or doubtful portions of the river channel from the eastern limit of Montreal Harbour to Quebec were thoroughly tested and examined.

This work together with the placing and supervision of the dredges, occupied the whole time of one Engineer and an Assistant Engineer with the necessary steamer and equipment; throughout the whole season.

The places of most danger were examined first.

At Cap à la Roche, the channel as dredged, was in perfect order.

Near Champlain the sand bars were found as usual. These sand bars are composed of narrow ridges and banks of sand. They are not dangerous and only cause trouble to heavy draft flat bottomed ships. These sand bars were removed before the season of low water commenced.

An attempt is being made to devise a way to prevent these sand bars forming after the now usual practice of the prevention of snow banks in railway cuttings.

The Lake St. Peter Channel has banks of 17 feet, in soft blue clay which has held good for 13 years without any re-dredging.

The examination here showed that while the centre of the channel and the whole of the north half were in perfect order, there were parts of the south bank hacked, and washed and caved in.

Arrangements are being made to widen and deepen these parts of the Lake St. Peter channel early in 1901.

The whole of the remainder of the Ship Channel was found in perfect order, free of obstructions.

The River St. Lawrence Ship Channel from the limits of Montreal Harbour to Quebec and under the control of this department was almost entirely free from accidents during the season of 1900; and none were in any way attributable to the channel.

The total cost of the Ship Channel, including plant shops, &c., up to the end of the fiscal year 1899-1900 was \$5,619,320.66 and the quantity dredged in cubic yards amounted to 24,532.270.

For the fiscal year the cost was for dredging \$100,191.01 and plant and shops &c., \$265,270.78, while the quantity dredged was 1,107.894 cubic yards.

Five elevator dredges were employed during the fiscal year ended June 30th 1900.

#### DREDGE "LAURIER".

The dredge "Laurier" continued working from July 1st. 1899 at Varennes, widening to 450 feet and deepening to 29.0 feet at extreme low water, completing this particular work on Oct., 12th, during the 87 days work, 186,000 cubic yards of blue clay were removed. From Oct., 12th, until Nov., 28th 1899 and from April 28th until June 30th 1900, this dredge worked on the Cap St. Michel straight channel; straightening, widening to 450 feet, and deepening to 29.0 feet at E. L. W. From May 15th until the close of the fiscal year the dredge worked day and night. During the 96 days, including 35, day and night, 274, 160 cubic yards of blue clay were dredged.

The total quantity dredged by the dredge Laurier during the fiscal year amounted to 460,160 cubic yards, costing \$21,374.08 or  $4\frac{11}{10}$  cents per cubic yard.

#### DREDGE "LAVAL".

On July 1st 1899 the dredge "Laval" was working on the south half of the 500 foot cut through some isolated shoals at Cap Santé. This work was completed on August 12th and tested to 29.0 feet. During the 37 days work with the aid of the stone lifter, 11,800 cubic yards of stones and gravel were removed at a cost of  $26\frac{1}{100}$  cents per yard.

From August 14th until Sept. 9th 1899, this dredge worked on the first cut

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of the channel through Ste. Croix Bar. In the 24 days work 19,700 cubic yards of sand and stones were removed, with the aid of the stone lifter, at a cost of  $10\frac{1}{10}$  cents per yard.

From Sept. 11th until Oct. 14th this dredge was engaged cleaning up the sand bars at Pointe Citrouille near Champlain, nearly half the time being lost for repairs. In the 28 days 15,825 yards were removed costing  $14\frac{4}{10}$  cents per cubic yard.

From Oct. 16th until Nov. 30th with the exception of 8 days at Three Rivers, this dredge worked at Stone Island, near Sorel, widening and deepening. In the 33 days work 35,650 cubic yards of soft clay were removed costing  $7\frac{9}{10}$  cents per yard.

During the 8 days work at Three Rivers this dredge was engaged cutting the tops off small isolated shoals in otherwise deep water. The quantity dredged of clay and stones amounted to 3,100 cubic yards and cost  $21\frac{5}{10}$  cents per yard.

From April 30th until June 30th 1900, this dredge worked at Three Buoys channel below Cap St. Michel, straightening, widening and deepening. During the 53 days work including 34 of night work, this dredge removed 99,158 cubic yards of hard clay and stones, at a cost of  $7\frac{3}{10}$  cents per yard.

The total quantity dredged by this dredge during the fiscal year amounted to 185,383 cubic yards costing \$18,332.53 or  $9\frac{9}{10}$  cents per yard.

## DREDGE "NO. 8".

Dredge "No. 8" worked in Quebec Harbour under the supervision of the Quebec Harbour Commissioners from July 1st 1899 until the close of the season.

From May 11th until June 30th 1900 this dredge worked on very difficult work at Three Rivers, widening and deepening the channel opposite the city. During the 46 days work 10,986 cubic yards of stone and clay were removed at a cost of \$3,591.60 or  $32\frac{6}{10}$  cents per yard.

## DREDGE "NO. 11".

During the whole of the fiscal year dredge "No. 11" worked widening to 450 feet, and deepening to, 29.0 feet; the channel from Varennes to Cap St. Michel.

From July 1st until Nov. 25th 1899, and from May 15th until June 30th 1900, making 159 days working, this dredge removed 208,530 cubic yards of soft clay at a cost of \$16,164.44 or  $7\frac{5}{10}$  cents per yard.

## DREDGE "LADY ABERDEEN".

The dredge "Lady Aberdeen" a large and powerful new steel dredge, the result of long experience in design and practice, built at the Departmental shops at Sorel was put in commission in May 1900. This dredge a type of a thoroughly modern elevator dredging machine proved a complete success in every way.

Commencing May 12 this dredge worked until the close of the fiscal year at l'Ile de Grâce near Sorel, widening and deepening. In 41 days work 185,800 cubic yards were removed at a cost of \$6,845.84 or  $3\frac{6}{10}$  cents per yard.

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## DREDGING SHIP CHANNEL, RIVER ST. LAWRENCE BETWEEN MONTREAL AND QUEBEC.

Vessels.	Fuel.	Wages.	Board.	Stores and Materials.	Rebuiding and Repairs.	Expenditure on New Plant and Ship yard improvement.	Proportion of General Maintenance expenses, inclusive of surveys, inspection, etc.	Total expenditure for each vessel.	Total expenditure for each service.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Dredge									
" Laurier	2,491 25	3,750 40	1,345 49	1,066 60	3,341 84		2,776 64	14,772 22	
" Laval	2,320 50	3,636 02	1,369 59	665 21	2,448 94		2,416 63	12,856 89	
" "									
" "									
" "									
" "									
" "									51,919 12
" No. 11.	1,976 50	2,889 26	987 53	432 65	2,310 47		1,989 83	10,586 24	
" " S.	1,061 50	2,885 51	1,003 33	368 16	2,088 92		1,714 61	9,122 03	
" " S.									
" " S.									
" " S.									
" Lady Aber'n	392 00	1,434 82	492 48	882 97	526 39		863 08	4,581 74	
" "									
Stone Lifter									
" No. 2.	21 14	420 96	92 90	160 26	285 68		227 37	1,218 31	1,218 31
" " 2.									
Tug St. Jean									
" Ibern'le	1,454 85	2,206 43	788 08	640 40	272 20		1,239 90	6,601 86	
" Cartier.	1,006 39	2,116 05	737 05	240 62	346 31		1,029 22	5,475 64	
" Minnie F. Parsons	501 13	827 84	251 23	327 77	769 08		619 62	3,296 67	
" Emilia.	536 14	1,833 87	679 43	383 41	258 37		854 41	4,545 63	47,053 58
" St. Frs.	518 76	1,542 43	482 25	413 87	286 88		750 93	3,995 12	
" Eureka	1,367 09	2,237 70	791 45	930 30	2,608 17		1,836 66	9,771 37	
" J. Pratt	1,420 00	3,245 57	1,071 62	587 07	804 72		1,650 16	8,779 14	
" St. Ja'es	986 26	1,928 48		486 03	324 16		863 22	4,588 15	
Hydrographic Survey									
New Dredging Plant.									
New Btil'gs & Eq't.						17,796 38			
" Steel D.									
" No. 3.						40,639 75			
" Steel D.									
" No. 4.						40,432 85			
" Wooden D. No. 5						31,607 14			
" D. No. 6						1,261 74			
" Tug St. J.									
" No. 4						3,379 92			
" " No. 5						17,337 95			
" " No. 6						11,750 56			
" " No. 7						1,175 20			
4 New Dumping Scows.						3,005 44			
3 New Dumping Scaws.						3,120 11			
New B. No. 2						2 40			
" Stone L.									
" No. 3						28 39			
Elect'al Eq't of D., T. & V.						15,972 90			
Fuel on hand						11,763 85			
Con's Mate'l & S. on hand						65,996 20			
	16,053 51	30,955 34	1,092 43	7,585 32	16,672 13	265,270 78	18,832 28	100,191 01	100,191 01





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## DREDGING AT BUCKINGHAM WHARF, QUE.

During the 17th and 18th of July, and the 6th to the 10th October 1899, dredging was done by the dredge "T.F.M. No. 1," at Buckingham wharf, making 4 cuts 70 feet long, 15 feet wide and one cut 60 feet long, 20 feet wide, to a depth of 10 feet at low water.

The material removed consisted of 2350 cubic yards of mud, clay and saw-dust.

## DREDGING AT CHATEAUGUAY, QUE.

Between the 13th of November and the 2nd of December 1899, dredging was performed on the Chateauguay River, by the dredge "Little Giant," below the basin, removing sand and boulder shoals, which forms in this locality by the spring freshets, greatly retarding navigation.

7630 cubic yards of boulders, clay and hard-pan were removed.

On the 23rd May 1900, work was resumed at this place by the dredge "No. 4" principally on a shoal, at the mouth of the River and continued up to the 30th June 1900.

The total quantity of material removed, at this place, consisted of 204,320 cubic yards of hard-pan, boulders and clay.

## COTEAU LANDING, QUE.

Operations were begun at this place on October 7th 1899, by dredge "No. 4," under contract awarded to L. Cohen & Sons, for the dredging of a channel through a boulder shoal, between the New Elevator Dock and the Soulanges canal. This work continued up to the 4th November 1899.

On the 9th May 1900, operations at this place were resumed by the contractor, and continued up to the 30th June, end of the fiscal year, removing 11,138 cubic yards of boulders and gravel.

## DREDGING AT DORVAL, QUE.

Between the 7th of August and the 2nd September, also between the 11th of September and the 4th of October 1899, dredging was done at this place, by the dredge "Little Giant," a channel was made from the boat landing out to deep water, 75 feet wide at the outer end, and 150 feet wide at the shore end, all to a depth of 10 feet at low water.

23,433 cubic yards of sand and clay were removed.

## DREDGING ISLE PERROT, QUE.

Dredging was performed at this place, by the Dredge "Little Giant" deepening the approach to wharf, to 7 feet at low water. A greater depth could not be made owing to the rock bottom.

716 cubic yards of hard-pan and shale rock were removed.

## DREDGING AT LOTBINIERE QUE.

Between the 21st of May and 20th of June 1900, the Dredge "Nithsdale" worked at this place. Two cuts were made along the face of the wharf, 270 feet long, 25 feet wide, to a depth of 8 feet at low tide. Three cuts 100 feet long, to a depth of 6 feet at low tide were also made, at the east end of a boulder shoal opposite the wharf, and near the main channel.

The material removed consisted of 5599 cubic yards of clay and boulders.

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## DREDGING IN OTTAWA RIVER (GREEN SHOALS).

Between the 20th September and the 5th October, dredging was done at the Green Shoal, alongside the lighthouse near East-Templeton, by the Dredge "T. F. M. No. 1." During the above period, two cuts were made, 165 feet long and 10 feet wide, and one cut 165 feet long and 20 feet wide, to a depth of 10 feet, near lighthouse, and 9 feet on the north side.

The material removed consisted of 1450 cubic yards of boulders and shale rock.

## DREDGING AT POINTE CLAIRE QUE.

On the 5th of October 1899, operations were begun at this place, by the dredge "Little Giant" and continued up to the 11th November 1899.

From the main channel to the wharf, two cuts were made one 800 and one 400 feet in length, each 25 feet wide, and 10 feet deep.

9400 cubic yards of boulders, hardpan and clay were removed.

Owing to the lateness of the season and rough weather, dredging was discontinued before the work was completed.

## DREDGING AT RICHELIEU RIVER, QUE.

Dredging operations were being continued in this river at the beginning of the fiscal year, by the Dredge Canals No. 1. In the harbour at St. Johns, three cuts were made, in the center of the channel, one 460 feet, one 450 feet and one 270 feet long each cut 25 feet wide and  $9\frac{1}{2}$  feet deep.

In the channel below Isle-aux-Noix, there was one cut made, 1,687 feet long, 25 feet wide and 10 feet deep.

In the channel on the Pointe-à-la-Mule Flats, two cuts were made, each 1,000 feet in length, 25 feet wide and 10 feet deep at low water.

31,650 cubic yards of sand, hard-pan boulders and clay were removed.

## RIVIÈRE DU LIÈVRE.

Dredging operations were resumed at this place on the 19th July, and continued up to the 19th of September, also between the 11th of October, and the 22nd November, 1899, channels were made through shoals at the mouth of the river, and in the river itself. As this material is composed largely of slabs the dredging was very difficult.

At Mr. Larens' wharf, Masson village, two cuts were made and an old dam removed to permit the vessels free access to the wharf.

On the 10th May, 1900, operations were resumed on this river, by the dredge "T. F. M. No. 1," and continued up to the 30th June, removing the slab, boulder, and hardpan shoals above and below Ross' dock. All work done on this river was to a depth of 10 feet at low water.

The total quantity of material removed, consisted of, 57,200 cubic yards of slabs, sawdust, clay, boulders and hardpan.

## DREDGING AT ST. FRANCIS, QUE.

Dredging operations were being performed, by the dredge "St. Louis" in the river from the 1st of July, 1899, continuously up to the 13th November, the close of navigation.

The work done during this period was between, Pierreville Mills, which are located 3 miles from the mouth of the river upwards to the 6-mile mark a short distance above Isle-à-l'Aile. Five cuts were made at different sections between

the above points as follows: 2,467, 3,330, 1,300, 1,151 and 714 feet in length to a depth of 5 feet at low water.

19,555 cubic yards of sand were removed.

#### DREDGING AT ST. JEAN DES CHAILLONS, QUE.

From June the 21st to 30th, the close of the fiscal year, 1900, the dredge "Nithsdale" worked at this place removing 3,272 cubic yards of gravel, clay and boulders.

#### DREDGING AT ST. LAURENT D'ORLEANS, QUE.

Between the 11th and the 16th of November, 1899, the dredge "Nithsdale" was engaged, dredging on the western side of the St. Laurent wharf. Two cuts were made, 100 feet long 22 feet wide, to a depth of 8 feet at outer end, and 6 feet at inner end, being the greatest depth obtainable owing to a rock bottom. The material removed consisted of 1,225 cubic yard of sand.

#### DREDGING AT ST MICHEL DE BELLECHASSE, QUE.

On the 3rd July, 1899, the dredge "Nithsdale" was employed, at St. Michel, and worked there until the 10th of November, doing the following dredging:

Opposite the face of the wharf two cuts, 400 feet long, and two 300 feet long were made, each cut being 25 feet wide, also one cut on the western side of the wharf, 100 feet long all to a depth of 9 feet at low tide.

The material removed consisted of 17,591 cubic yards of clay, stone, boulders and hardpan.

The work at this place being in tidal waters not more than 6 hours work per day could be performed, and a great part of the time was lost from rough weather owing to exposed locality.

#### DREDGING AT ST. NICHOLAS, QUE.

On the 1st May 1900 the dredge "Nithsdale" commenced operations at this place and continued up to the 19th of the same month, making two cuts along side of the wharf, 120 feet long, 25 feet wide, to a depth of 10 feet at outer end and 6 feet at inner end, all the depth that could be made owing to a rock bottom.

3,395 cubic yards of material were removed, consisting principally of stones and old timber.

#### DREDGING AT VALLEYFIELD, QUE.

From the 4th of June, up to the close of the fiscal year, dredging was continued at Valleyfield, deepening and widening the channel leading to the cotton mills. This work was performed by the dredge "No. 7." One cut made 500 feet long, 25 feet wide, to a depth of 10 feet. 2,440 cubic yards of boulders were removed.

#### YAMASKA RIVER, QUE.

Between the 25th April and 30th June 1900, dredging operations were carried on in this river, below the Yamaska dam, deepening the channel a distance of 2,491 feet to a depth of 5 feet at low water.

10,145 cubic yards of sand were removed.

## PROVINCE OF ONTARIO.

## DREDGING AT BELLEVILLE, ONT.

Between the 9th and 26th of October 1899, the dredge "Queen," worked at Belleville, making two cuts in the harbour channel, one 400 feet and one 300 feet in length, to a depth of 10 feet at low water.

The material removed consisted of 5,490 cubic yards of gravel and boulders.

## DREDGING AT COBOURG, ONT.

On the 3rd July 1899, the dredge "Nipissing" was working at Cobourg, deepening between the piers and continued there to the 26th of the same month. The following cuts were made from the T out to the light-house: One 1145 ft., one 895 ft., one 350 ft. and one 100 ft. in length, each cut being 25 feet wide to a depth of 14 feet at low water. 11,249 cubic yards of sand and hardpan were removed.

## DREDGING AT COLLINGWOOD, ONT.

The dredge "Challenge" and plant was engaged at this place from the 6th November to the 7th December 1899, deepening from the main channel, to the Meat Company's proposed new wharf. A cutting was made 540 feet long, 25 feet wide, to a depth of 15 feet at low water and 5040 cubic yards of clay were removed. On the 15th May 1900, the dredge resumed operations at this place and continued to work there up to the 30th June, the close of the fiscal year, completing one cut from the channel to the Meat Company's wharf, 1330 feet long, 25 feet wide and 15 feet deep, as well as deepening along the old Slub wharf to Charlton's Mill pond; where a cut was made 530 feet long, and one adjoining cut 300 feet long to a depth of 10 feet at low water.

The total quantity of material removed at this place, was 18,695 cubic yards of clay, boulders stone and sand.

## DREDGING AT DESERONTO, ONT.

Work was done at this place by the dredge "Queen," between the 5th and 16th of June 1900, deepening an approach to the smelting works ore dock. Two cuts were made 150 feet long and one cut 100 feet, to a depth of 16 feet at low water. 1,800 cubic yards of mud and clay were removed.

## DREDGING AT FORT WILLIAM, ONT.

On the 1st July 1899, dredging operations were being performed at Fort William, on the Kaministiquia River, and was continued up to 4th Nov. 1899.

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The work done by the spoon dredge "Arthur" consisted in deepening in front of the New Steel Elevator wharf and coal docks, for the purpose of allowing free access for deep draught vessels. Dredging was done to 20 ft. at low water and the material removed consisted of 49,770 cubic yards of sand and clay.

Dredging was resumed along New Steel Elevator Dock, on the 15th of May 1900, continuing up to the 30th June, the close of the fiscal year.

17,488 cubic yards of sand and clay were removed.

#### DREDGING AT HAMILTON, ONT.

Between the 26th and 30th June 1900, the dredge "Queen" worked at the Hamilton Smelting works dock, making two cuts 250 feet long and one cut 60 feet long to a depth of 16 ft. at low water, and removed 1080 cubic yards of clay.

#### DREDGING AT HAWKESBURY, ONT.

Dredging operations were continued at this place, from the previous fiscal year, up to the 4th August 1899.

The channel between Higgeness's and Lawlor's wharfs was deepened and widened and a turning basin partially made at Lawlor's wharf.

A depth of 8 ft. was made at low water and 8,755 cubic yards of clay, stone, sand and boulders were removed.

As experienced in many other localities, the work at this place could not be completed satisfactorily, owing to the large number of boulders encountered necessitating the services of a stone-lifter.

#### DREDGING AT JORDAN ONT.

On the 3rd July 1899, the Dredge "Ontario" was working at this place, and continued up to the 13th of the same month, completing a turning basin, 140 feet square to a depth of 12 feet at low water, also completing a channel from the basin out to deep water to same depth.

The material removed consisted of 5,580 cubic yards of sand.

#### DREDGING AT KINGSTON ONT.

The Dredge "Queen" commenced operations in this harbour on the 22nd August 1899, and continued to work until the 6th October, also between the 1st and 21st of November. The work consisted of widening the approach to Richardson's elevator, deepening along western side of Montreal Transportation Company's elevator, and the approach to Crawford's dock; the dredging in front of Richardson's elevator was done to a depth of 18 feet and the other work to 14 feet at low water. The material removed consisted of 11400 cubic yards of hardpan and gravel.

The Dredge "Nipissing" was also placed at work in this harbour on the 9th November and worked there until the 21st November, the close of navigation, deepening along the front of the Montreal Transportation Company's wharf com-

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pleting the work that was left unfinished by the Elevator Dredge. The depth of water made was 18 feet and the material removed was 2362 cubic yards of hard-clay.

Operations were resumed, in the harbour, on the 17th of May 1900; the Dredge "Queen" continuing up to the 2nd June and the Dredge "Nipissing" up to the 30th June 1900. The Dredge "Queen" was engaged at further widening the approach to the docks while the "Nipissing" performed the following work: on each side of the Montreal Transportation Company's elevator; on the west side two cuts were made, one 300 feet long, inside of break-water, and one cut 115 feet long on the outside, also a basin was made on the east side, 200 feet long, and 250 feet wide, to a depth of 15 feet at low water, with an inside cut, extending 100 feet farther alongside of elevator. The material removed was as follows:—Dredge "Queen": 1800 cubic yards of hard-pan. Dredge "Nipissing": 13,455 cubic yards of clay.

## DREDGING AT MEAFORD ONT.

The Dredge "Challenge" was engaged at this place, between the 3rd and 26th July 1899, in deepening and widening the inner harbour, completing a basin 250 feet long, 100 feet wide, to a depth of 13 feet at low water, and removing 12,420 cubic yards of sand gravel and clay.

## DREDGING AT NEWCASTLE ONT.

From the 2nd to the 11th of October 1899, work in this harbour was performed by the Dredge "Ontario". One cut being made from the mouth of the piers, into the harbour, a distance of 980 feet, to a depth of 12 feet, except at the inner end, where only 9½ feet could be obtained owing to a rock formation.

5760 cubic yards of sand were removed.

Between the 18th and 22nd June 1900, the Dredge "Queen" made one cut along the east pier, 580 feet long, 25 feet wide, to a depth of 14 feet, to enable coal vessels to enter and unload.

The material removed at this place, consisted of 1800 cubic yards of sand.

## DREDGING AT OAKVILLE ONT.

The Dredge Nipissing was engaged, at Oakville Ont., between the 21st of September 1899, and the 20th. October, dredging foundations for new piers and and removing a gravel bar which had formed owing to a break in the old pier. The dredging was done to a depth of 14 feet at low water. The material removed consisted of 18 317 cubic yards of clay gravel and boulders.

## DREDGING AT OSHAWA ONT.

Between the 17th. and 26th. of July 1899, the dredge "Ontario" was employed at this locality, dredging through a sand shoal, at the east side of the pier, through which a cutting was made, 256 feet long, 50 feet wide, to a depth of 12 feet at low water; Removing 4380 cubic yards of sand and hardpan;

## DREDGING AT PICTON ONT.

On the 1st. July 1899, the dredge "Queen" was working at Pictou Out., in front of the crib-work, opposite the Orphan's Home, and continued there up to the 14th., of the same month. Three cuts were made out to deep water 225 feet long 25 feet wide, 13 feet at outer end and 10 feet at inner end. At Rathbun's wharf, two cuts were made 75 feet long, to a depth of 12 feet from the front of the wharf out to deep water.

The quantity of material removed at both places was 2610 cubic yards of mud and blasted rock.

## DREDGING AT PORT HOPE, ONT.

On the 27th July 1899, the dredge "Nipissing" commenced operations at Port Hope, Ont., and remained there up to the 20th of September, deepening between the piers, from the entrance to the harbour to 12 feet at low water. The plant was then taken to Oakville and returned to Port Hope, on the 1st November and continued operations on the entrance to the new harbour up to the 8th of the same month. The total quantity of material removed at this place was 25,311 cubic yards of sand.

## DREDGING AT ROCKLAND, ONT.

Between the 1st and 15th of July 1899, dredging was done at this place, by the dredger "T. F. M. No. 1," cleaning the approaches to the wharf, as well as in front of the wharf itself, to a depth of 12 feet at low water.

8,200 cubic yards of slabs, sawdust and clay were removed.

## DREDGING IN SOUTH NATION RIVER ONT.

On the 25th September, operations were commenced in this river, by the dredge "Dundas" below Cass Bridge, and continued up to the 31st October 1899. This work consisted in deepening the river and casting over the dredged material on the bank.

Work was resumed at this place, on June the 28th, and continued to the end of the fiscal year.

A channel 725 feet long and 25 feet wide was made. About 4500 cubic yards of clay, boulders and gravel were removed.

## DREDGING AT THORNBURY ONT.

The dredge "Challenge" commenced operations, at Thornbury, on the 29th July, and worked there up to the 31st October 1899, dredging alongside the pier to the new breakwater, to a depth of 15 feet, as well as inside the breakwater where a basin was made, 400 feet long and 250 feet wide, tapering to 100 feet at inner end to a depth of 14 feet at low water.

The material removed consisted of 38,940 cubic yards of hard-pan, mud, sand and gravel.



## DREDGING AT WHITBY HARBOUR ONT.

Operations in this harbour were continued from the 27th July to the 28th September 1899, also between the 16th of October and the 20th of November 1899.

One cut was made in front of Watson's wharf, 404 feet long, 25 feet wide and 12 feet deep, and one cut between Watson's wharf and the elevator, 145 feet long, 25 feet wide and 16 feet deep.

From the harbour out to deep water, the following cuts were made: two 1050 feet long, 24 feet wide, alongside the eastern pier. One each of 875, 920 and 995 feet in length, having a total width of 73 feet, alongside the western pier, all to a depth of 12 feet at low water.

39,100 cubic yards of sand, and mud were taken out as well as a number of sunken logs.

## DREDGING AT WOLFE ISLAND ONT.

Operations were performed at this place, by the dredge "Queen", between the 15th. July and 19th. of August 1899 deepening in front of steamboat wharf out to navigable water. Two cuts were made, 590 and 640 feet respectively, and along the face of the wharf, three cuts were made of 150, 180 and 300 feet in length, all to a depth of 9 feet at low water. 7,800 cubic yards of mud and clay were removed.

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DREDGING—MARITIME PROVINCES.  
 CLASSIFICATION OF DISBURSEMENTS of the Dredges operated by the Public Works Department during the year ended  
 June 30, 1900.  
 DREDGE "CHALLENGER" AND PLANT

Items.	July	August	September	October	November	December	January	February	March	April	May	June	Grand Total
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Wages .....	418 39	420 00	420 00	420 00	420 00	180 68	.....	30 00	.....	.....	420 00	420 00	3,158 07
Coal .....	251 37	116 12	9 30	172 97	121 98	60 00	.....	.....	.....	.....	.....	345 21	1,276 95
Wood .....	.....	178 17	.....	63 00	.....	.....	.....	.....	.....	.....	.....	26 80	268 63
Provisions .....	112 25	113 00	113 00	113 00	113 00	51 18	.....	.....	.....	25 14	.....	113 00	783 67
Stores .....	.....	4 98	.....	9 18	10 63	3 21	.....	.....	.....	.....	.....	138 36	166 36
Equipment .....	4 00	.....	42 15	.....	21 70	.....	.....	.....	.....	.....	.....	.....	67 85
Repairs .....	43 68	156 49	.....	2 50	.....	10 25	.....	.....	172 42	476 96	.....	401 93	1,264 23
Pilotage .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Towage .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Contingencies .....	4 38	.....	.....	1 90	.....	49 00	.....	.....	15 70	8 02	.....	19 00	98 00
Total .....	834 17	983 78	580 43	782 55	687 31	363 41	.....	30 00	188 12	510 12	420 00	1,064 30	7,053 25
Working Expenses .....	790 49	827 29	580 43	780 05	687 31	353 16	.....	39 00	15 70	33 16	420 00	1,262 43	5,780 02
Repairs, ordinary .....	43 68	156 49	.....	2 50	.....	10 25	.....	.....	172 42	.....	.....	.....	389 34
extraor. dinary .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	476 96	.....	401 93	878 80
Total .....	834 17	983 78	580 43	782 55	687 31	363 41	.....	30 00	188 12	510 12	420 00	1,064 30	7,053 25

DREDGING—QUEBEC & ONTARIO.—*Continued.*

CLASSIFICATION OF DISBURSEMENTS of the Dredges operated by Department of Public Works during the year ended June 30 1900.

## DREDGES "NIPISSING" &amp; "PLANT."

Items.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	Grand Total.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Wages.....	380 29	385 00	407 00	385 00	370 00	72 14	30 00	30 00	30 00	.....	420 82	385 00	2,431 36
Coal.....	154 25	344 45	.....	92 82	126 41	.....	.....	.....	.....	.....	.....	383 93	1,101 86
Provisions.....	101 39	103 00	106 15	103 00	94 33	11 61	.....	.....	.....	.....	.....	185 14	704 02
Stores.....	2 75	6 52	2 55	9 25	.....	.....	.....	30 96	.....	.....	.....	256 89	308 92
Equipment.....	.....	14 33	32 29	.....	.....	.....	.....	.....	.....	.....	.....	.....	46 62
Repairs.....	68 35	128 80	7 90	28 51	45 98	265 14	.....	.....	20 47	219 67	21 49	836 61	1,612 90
Contingencies.....	.....	.....	17 77	.....	26 39	29 13	.....	.....	.....	.....	.....	18 92	92 43
Total.....	713 03	992 10	573 66	628 58	663 31	378 04	30 00	60 96	50 47	219 67	442 30	2,076 49	6,828 61
Working expenses.....	644 68	863 30	565 76	640 07	617 32	112 90	30 00	60 96	30 00	.....	420 82	1,239 88	5,185 71
Repairs, ordinary.....	68 35	128 80	7 90	28 51	45 98	.....	.....	.....	20 47	.....	21 47	.....	321 48
"    extraordi- nary.....	.....	.....	.....	.....	.....	265 14	.....	.....	.....	219 67	.....	836 61	1,321 42
Total.....	713 03	992 10	573 66	628 58	663 31	378 04	30 00	60 96	50 47	219 67	442 30	2,076 49	6,828 61

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DREDGING—QUÉBEC & ONTARIO—Continued.  
 CLASSIFICATION OF DISBURSEMENTS of the Dredges operated by the Public Works Department during the year  
 ended 30th June, 1900.

DREDGE "ONTARIO" AND PLANT.

Items.	July.		August.		September.		October.		November.		December.		January.		February.		March.		April.		May.		June.		Grand Totals.		
	£	cts.	£	cts.	£	cts.	£	cts.	£	cts.	£	cts.	£	cts.	£	cts.	£	cts.	£	cts.	£	cts.	£	cts.	£	cts.	
Wages.....	395	00	395	00	345	00	395	00	437	57							101	61					54	50	2123	68	
Coal.....	254	58	121	95	156	97	201	46	366	61													38	82	1139	99	
Wood.....																											
Provisions.....	103	00	103	00	103	00	103	00	134	00													56	67	602	67	
Stores.....	4	53			6	10	17	72	13	60													265	14	247	18	
Equipment.....			10	05	30	74			2	29													16	80	59	97	
Repairs.....	9	38			4	50	76	93	14	67									413	42			1670	71	1536	24	
Pilotage.....									50	00														15	00	65	00
Towage.....																											
Contingencies.....	13	61	4	00					113	95													16	50	148	46	
Total.....	780	10	634	00	645	91	794	11	1132	78							101	61	413	42	1687	60	1922	87	8112	40	
Working expenses.																											
Repairs, ordinary.	770	72	624	00	641	41	717	18	1118	11							101	61			16	89	386	63	4386	55	
Repairs, extraor- dinary.....	9	38			4	50	76	93	14	67									413	42	1670	71	1536	24	2620	37	
Total.....	780	10	634	00	645	91	794	11	1132	98							101	61	413	42	1687	60	1922	87	8112	40	

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DREDGING—QUEBEC AND ONTARIO.—*Continued.*  
 CLASSIFICATION OF DISBURSEMENTS of the Dredges operated by the Public Works Department during the year ended  
 June 30, 1900.

## DREDGE "QUEEN" AND PLANT.

Items.	July		August		September		October		November		December		January		February		March		April		May		June		Grand Total	
	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.		
Wages .....	373	49	385	56	402	86	355	00	371	61	71	30	30	00	30	00	30	00	.....	.....	193	33	379	17	2,632	32
Coal .....	157	43	345	42	187	56	237	97	161	87	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	434	01	1,524	26
Wood .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Provisions .....	95	58	101	39	103	45	100	42	92	35	7	74	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Stores .....	21	37	3	10	6	85	10	58	3	30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Equipment .....	.....	.....	8	50	4	66	12	90	6	40	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Repairs .....	2	84	20	91	24	46	233	13	58	17	52	44	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pilotage .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Contingencies .....	9	15	6	65	.....	.....	7	75	.....	.....	12	56	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total .....	680	86	881	53	729	84	957	75	683	70	144	04	30	00	30	00	30	00	170	50	203	88	1,179	64	5,791	50
Working Expenses .....	600	02	800	62	705	38	724	62	634	53	91	60	30	00	30	00	30	00	.....	.....	.....	.....	.....	.....	.....	.....
Repairs, ordinary .....	20	84	20	91	24	46	233	13	58	17	52	44	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
"    extraor dinary .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total .....	680	86	881	53	729	84	957	75	683	70	144	04	30	00	30	00	30	00	170	50	203	88	1,179	64	5,791	50

## DREDGING—QUEBEC AND ONTARIO.—Continued.

CLASSIFICATIONS OF DISBURSEMENTS of the Dredges operated by the Public Works Department during the year ended  
June 30, 1900.

## DREDGE CANALS "No. 1."

Items.	July	August	September	October	November	December	January	February	March	April	May	June	Grand Total
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Wages .....	360 00	385 00	430 00	390 00	265 50	.....	30 00	30 00	.....	.....	408 00	380 00	2 708 50
Coal .....	150 94	112 12	150 00	100 00	50 00	.....	.....	.....	.....	.....	.....	584 90	1 147 96
Provisions .....	120 00	120 00	120 00	101 75	66 01	.....	.....	.....	.....	.....	.....	200 00	727 76
Stores .....	10 34	6 43	9 00	6 52	2 78	.....	.....	.....	.....	.....	.....	15 00	50 07
Equipment .....	1 00	1 45	7 90	.....	.....	.....	.....	.....	.....	.....	.....	.....	10 35
Repairs .....	18 62	88 81	18 08	21 18	13 06	102 77	.....	.....	.....	208 16	166 61	174 52	811 81
Contingencies .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5 80	.....	.....	5 80
Total .....	640 90	713 81	724 98	619 45	427 35	102 77	30 00	30 00	.....	213 96	574 61	1,364 42	5,462 25
Working Expenses	642 28	625 00	706 90	598 27	414 29	.....	30 00	30 00	.....	5 80	408 00	1,189 90	4,650 44
Repairs, ordinary.	18 62	88 81	18 08	21 18	13 06	102 77	.....	.....	.....	.....	.....	.....	262 42
"    extraor- dinary.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	208 16	166 61	174 52	540 39
Total .....	660 90	713 81	724 98	619 45	427 35	102 77	30 00	30 00	.....	213 96	574 61	1,364 42	5,462 25

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DREDGING—QUEBEC AND ONTARIO—*Continued.*  
 CLASSIFICATION OF DISBURSEMENTS OF Dredges operated by the Public Works Department, &c.—*Continued.*  
 DREDGE ST. "LOUIS" AND PLANT.

Items.	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	Grand Total.
	% cts.	% cts.	% cts.	% cts.	% cts.	% cts.	% cts.	% cts.	% cts.	% cts.	% cts.	% cts.	% cts.
Wages.....	350 00	350 00	350 00	350 00	214 35						350 00	350 00	2,314 35
Coal.....	74 75		35 00	56 34									146 09
Wood.....							25 50						25 50
Provisions.....	103 00	103 00	103 00	103 00	58 17							254 56	704 73
Stores.....	18 00												18 00
Equipment.....	2 86												2 86
Repairs.....	65 30	56 61	44 66	3 25	80 10	56 65				105 81		66 61	368 90
Contingencies.....					1 23		4 50					14 50	20 23
Total.....	613 91	509 61	532 66	492 59	353 85	56 65	30 00			195 81	350 00	665 67	3,800 75
Working expenses.	548 61	453 00	488 00	489 34	273 75		30 00				350 00	599 06	3,231 76
Repairs, ordinary..	65 30	56 61	44 66	3 25	80 10	56 65						66 61	373 18
" extraordinary										195 81			195 81
Total.....	613 91	509 61	532 66	492 59	353 85	56 65	30 00			195 81	350 00	665 67	3,800 75





## DREDGING—QUEBEC AND ONTARIO—Continued.

CLASSIFICATION OF DISBURSEMENTS OF Dredges operated by the Public Works Department during the Year ended June 30, 1900.

## DREDGE "NITHSDALE"

Items	July	August	September	October	November	December	January	February	March	April	May	June	Grand Total
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Wages.....	365 00	365 60	365 00	365 00	237 47	.....	.....	.....	.....	25 90	372 26	365 00	2,450 63
Wood.....	.....	.....	.....	2 30	.....	.....	.....	.....	.....	.....	.....	.....	2 30
Provisions.....	110 00	110 00	110 00	110 00	65 34	.....	.....	.....	.....	.....	.....	236 15	741 49
Stores.....	6 43	2 30	8 49	2 97	14 85	.....	.....	.....	.....	.....	.....	.....	35 04
Repairs.....	24 00	.....	.....	86 18	34 58	.....	.....	.....	.....	.....	.....	20 00	165 36
Contingencies.....	1,088 00	1,383 00	1,345 07	1,383 00	700 45	.....	.....	.....	.....	.....	.....	2,606 00	8,365 52
Total.....	1,594 03	1,800 30	1,828 56	1,949 45	1,102 69	.....	.....	.....	.....	25 90	372 26	3,227 15	11,960 34

Working expenses	1,509 43	1,800 30	1,828 56	1,863 27	1,068 11	.....	.....	.....	.....	25 90	372 27	3,207 15	11,794 98
Repairs, ordinary	14 60	.....	.....	86 18	34 58	.....	.....	.....	.....	.....	.....	20 00	165 36
Total.....	1,594 03	1,800 30	1,828 56	1,949 45	1,102 69	.....	.....	.....	.....	25 90	372 26	3,227 15	11,960 34

## DREDGE "T. F. M. No. 1"

Wages.....	32 50	67 50	65 00	65 00	47 50	.....	.....	.....	.....	.....	52 50	73 00	403 00
Contingencies.....	2,080 00	1,906 00	1,788 00	2,072 00	1,516 00	.....	.....	.....	.....	.....	1,428 00	2,048 00	12,928 00
Total.....	2,112 50	2,003 50	1,853 00	2,137 00	1,563 50	.....	.....	.....	.....	.....	1,480 50	2,121 00	13,331 00
Working expenses	2,112 50	2,003 50	1,853 00	2,137 00	1,563 55	.....	.....	.....	.....	.....	1,480 50	2,121 00	13,331 00
Total.....	2,112 50	2,003 50	1,853 00	2,137 00	1,563 50	.....	.....	.....	.....	.....	1,480 50	2,121 00	13,331 00



## SESSIONAL PAPER No. 19

## DREDGING—QUEBEC AND ONTARIO—Continued.

CLASSIFICATION OF DISBURSEMENTS OF Dredges operated by the Public Works Department during the Year ended June 30, 1900.

## DREDGE "DUNDAS"

Items	July		August		September		October		November		December		January		February		March		April		May		June		Grand Total
	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	\$	cts.	
Wages.....	.....	.....	.....	.....	149	16	260	06	121	34	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	201	86	732 36
Wood.....	.....	.....	.....	.....	.....	.....	121	95	31	50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	153 45
Stores.....	.....	.....	.....	.....	2	25	7	60	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9 85
Repairs.....	.....	.....	.....	.....	.....	.....	5	93	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5 93
Contingencies.....	.....	.....	.....	.....	10	35	1	28	1	00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12 63
Total.....	.....	.....	.....	.....	161	76	396	76	153	84	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	201	86	914 22
Working expenses.....	.....	.....	.....	.....	161	76	396	83	153	84	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	908 29
Repairs, ordinary.....	.....	.....	.....	.....	.....	.....	5	93	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5 93
Total.....	.....	.....	.....	.....	161	76	396	76	153	84	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	201	86	914 22





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## DREDGING—QUEBEC AND ONTARIO—Continued.

CLASSIFICATION AND QUANTITIES of Material removed by Dredges operated by the Public Works Department during the Year ended June 30, 1900.

## DREDGE "ST. LOUIS"

Description of Material dredged	July	August	September	October	November	December	January	February	March	April	May	June	Grand Total
	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.
Sand—ordinary...	4,485	4,665	4,290	4,840	1,425	.....	.....	.....	.....	585	4,800	4,770	29,700
Total.....	4,485	4,665	4,290	4,840	1,425	.....	.....	.....	.....	585	4,800	4,770	29,700

## DREDGE "No. 7"

Boulders.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,440	2,400
Total.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2,440	2,440

## CANALS No. 1"

Hard-pan.....	5,300	3,930	700	.....	.....	.....	.....	.....	.....	.....	.....	.....	9,930
Boulders.....	.....	160	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	160
Clay.....	.....	600	3,190	2,300	350	.....	.....	.....	.....	.....	4,050	5,430	16,520
Sand—ordinary.....	.....	.....	1,510	2,290	1,240	.....	.....	.....	.....	.....	.....	.....	5,040
Total.....	5,300	5,680	5,400	4,590	2,190	.....	.....	.....	.....	.....	4,050	5,430	31,650

## SESSIONAL PAPER No. 19

## DREDGING—QUEBEC AND ONTARIO—Continued.

CLASSIFICATION AND QUANTITIES OF Material removed by Dredges operated by the Public Works Department during the Year ended June 30, 1900.

## DREDGE "NITHSDALE"

Description of Material dredged	July	August	September	October	November	December	January	February	March	May	April	June	Grand Total
	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.	
Hard-pan.....	200												200
Boulders.....	150	160	165	25	10						1,190	4,464	6,101
Clay.....						336							
Clay and Stone.....	4,060	4,600	3,535	3,580	555						5,075	1,820	23,220
Sand—ordinary.....					1,230								1,225
Totals.....	4 410	4 760	3 640	3 065	1 785	336					6 265	6 281	31 082
DREDGE "No. 4"													
Hard-pan.....													
Boulders.....											475	1,520	1,995
Gravel.....											760		760
Clay.....											905		905
Clay and Stone.....				4 298	265						760	10,735	11,495
Totals.....				4 298	265						2,900	12,255	19,718

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## DREDGING—QUEBEC AND ONTARIO—Continued.

CLASSIFICATION AND QUANTITIES of Material removed by Dredges operated by the Public Works Department during the Year ended June 30, 1900.

## DREDGE "LITTLE GIANT"

Items	July.	August.	September.	October.	November.	December.	January.	February.	March.	April.	May.	June.	Grand Totals
	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.	c. yds.
Hard-pan.....			617	1,900	580								3,097
Boulders.....	135			95	146	30							426
Gravel.....											620		620
Clay.....	10,000	10,335	10,335	6,225	7,570	2,104							46,224
Clay and Stone.....	6,800												6,800
Sand—ordinary.....	500	1,495	780										3,275
Totals.....	7,455	11,495	11,732	8,220	8,296	2,134					620	3,605	54,057
DREDGE "T. F. M. No. 1"													
Hard-pan.....	2,175	3,600											7,175
Boulders.....	175	150	1,450	350							300		3,525
Gravel.....		500											500
Clay and Slab Saw Dust.....	8,200	1,000	8,950	10,700	10,800						2,350		45,400
Clay and Stone.....				2,250									2,250
Sand—ordinary.....	1,100	2,700									350		5,950
Mud.....											5,250		7,100
Totals.....	11,650	7,950	10,900	13,300	10,800						8,850	8,450	70,200
DREDGE "ARTHUR"													
Clay.....	5,160	5,280	5,536	6,410									28,045
Sand—ordinary.....	7,122	5,000	6,900	6,500	1,856						7,132		39,213
Totals.....	12,288	10,280	12,436	12,910	1,856						7,132	10,356	67,258



## SESSIONAL PAPER No. 19

## DREDGING — QUEBEC AND ONTARIO.

STATEMENT showing material removed at different localities, total annual expenditure on each Dredge, and average cost per cubic yard, for fiscal year ended 30th June, 1900.

## DREDGE "CHALLENGE"

Location.	Hard-pan.	Boulders.	Gravel.	Clay.	Clay and Stone.	Sand, ordinary.	Sand, fine.	Mud.	Total cubic yards.
	c. y.	c. y.	c. y.	c. y.	c. y.	c. y.	c. y.	c. y.	c. y.
Meaford .....			5,625	3,705		3,090			12,420
Thornbury .....	8,330		19,700		60	9,350		1,500	28,940
Collingwood .....	200	160		9,850	2,280	6,180		25	18,695
	8,530	160	25,325	13,555	2,340	18,620		1,525	70,055

Total annual expenditure, \$7,053.25. Cost per cubic yard, 10.3-5 cts.

## DREDGE "ONTARIO"

Jordan Harbour .....						5,580			5,580
Oshawa .....	150					4,230			4,380
Whitby .....				8,190		30,910			39,100
Newcastle .....						4,060		2,200	6,260
	150			8,190		44,780		2,200	55,320

Total annual expenditure, \$8,112.40. Cost per cubic yard, 14 $\frac{1}{4}$  cts.

## DREDGE "NIPISSING"

Cobourg .....	1,000					1,612	8,637		11,249
Port Hope .....						18,524	6,787		25,311
Oakville .....		475	8,000	9,842					18,317
Kingston .....	15,817								15,817
	16,817	475	8,000	9,842		20,136	15,424		70,694

Total annual expenditure, \$6,828.61. Cost per cubic yard, 9 $\frac{3}{4}$  cts.

## DREDGE "QUEEN"

Pictou .....		510						2,100	2,610
Wolfe Island .....				7,320				480	7,800
Kingston .....	6,690			5,880	630				13,200
Belleville .....			5,490						5,490
Deseronto .....				960				840	1,800
Newcastle .....						1,800			1,800
Hamilton .....				1,080					1,080
	6,690	510	5,490	15,240	630	1,800		3,420	33,780

Total annual expenditure, \$5,824.53. Cost per cubic yard, 17 $\frac{1}{4}$  cts.

STATEMENT showing the materials removed at the different localities, &c.—*Continued.*

## DREDGE "ST. LOUIS."

Location.	Hard-pan.	Boulders.	Gravel.	Clay.	Clay and Stone.	Sand ordinary	Sand fine.	Mud.	Totals. Cubic Yards.
	c. y.	c. y.	c. y.	c. y.	c. y.	c. y.	c. y.	c. y.	c. y.
St. Francis.....				1,995		17,560			19,555
Yamaska.....						10,145			10,145
				1,995		27,560			29,700

Total annual expenditure \$3,800.75. Cost per cubic yard 12½¢.

## DREDGE "No. 7."

Valleyfield.....	2,440								2,440
------------------	-------	--	--	--	--	--	--	--	-------

Total annual expenditure \$,2729.32. Cost per cubic yard \$1.11½.

## DREDGE "CANALS No. 1."

St. Johns.....	9,720	870		12,170		1,660			24,420
Richelieu.....				4,155		3,075			7,230
	9,720	870		16,325		4,735			31,650

Total annual expenditure \$5,462.25. Cost per cubic yard 17¼¢.

## DREDGE "DUNDAS."

South-Nation.....									4,500
-------------------	--	--	--	--	--	--	--	--	-------

Total annual expenditure \$914.22. Cost per cubic yard 20¼¢.

## DREDGE "NITHSDALE" (Contractor's.)

St. Michel.....	1,235	2,151		1,000	13100	105			17,591
St. Laurent.....						1,225			1,225
St. Nicholas.....		190			3,205				3,395
Lotbinière.....		2,799		1,000	1,800				5,599
St. Jean des Chaillons.....		362			2,910				3,272
	1,235	5,502		2,000	21015	1,330			31,082

Total annual expenditure \$11,900.34. Cost per cubic yard 38½¢.

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STATEMENT showing the material removed at the different localities, &c.—*Coteau Landing*

## DREDGE 'No. 4' (Contractor's).

Location.	Hard-pan.	Boulders.	Gravel.	Clay.	Clay and Stone.	Sand ordinary	Sand fine.	Mud.	Total Cubic Yards.
	c. y.	c. y.	c. y.	c. y.	c. y.	c. y.	c. y.	c. y.	c. y.
Coteau Landing.....		95		2,220	2,853			300	5,468
Chateauguay.....	1,995			6,080	6,175				14,250
	1,995	95		8,300	9,028				19,718

Total annual expenditure \$4,216.<sup>12</sup>/<sub>100</sub>. Cost per cubic yard, 21<sup>3</sup>/<sub>4</sub> cts.

## DREDGE 'LITTE GIANT' (Contractor's)

Hawkesbury.....		2,405			6,350				8,755
Dorval.....				23,433					23,433
Isle Perrot.....		617							617
Pointe Claire.....	1,520	220		7,660					9,400
Chateauguay.....					6,182				6,182
Coteau Landing.....					5,670				5,670
	2,137	2,625		31,093	18,02				54,057

Total annual expenditure \$9,176.00. Cost per cubic yard 16<sup>1</sup>/<sub>4</sub>.

## DREDGE 'T. F. M. No. 1' (Contractor's)

Rockland.....					8,200				8,200
Buckingham.....				2,250		1,100			3,350
Rivière du Lièvre.....	3,600	4,950		6,050	38,750	3,850			57,200
Ottawa River.....		1,450							1,450
	3,600	6,400		8,300	46,950	4,950			70,200

Total annual expenditure \$13,331.00. Cost per cubic yard 19 cts.

## DREDGE "ARTHUR" (Contractor's)

Fort William.....				29,747		37,511			67,258
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Total annual expenditure \$10,979.10. Cost per cubic yard 16<sup>1</sup>/<sub>2</sub> cts.

DREDGING—QUÉBEC AND ONTARIO—*Concluded.*

## CONSTRUCTION AND RENEWAL OF DREDGING PLANT

During the Spring of 1900 a new hull for dredge "Ontario" and two new 100 yard sea deck scows were under construction.

The two old 60 yard hopper scows were overhauled and put in working order.

Parts of the machinery of the dredge "Ontario" and the tugs "Delisle" and "Sir John" were also renewed at Ottawa.

The following expenditure was incurred.

## NEW DREDGE PLANT.

New dredge hull.....	\$8,501.00
Two 100 yard hopper scows .....	4,518.60

## DREDGE VESSELS REPAIRS.

Two old 60 yard hopper scows, repaired.....	878.19
Renewal of machinery.....	5,047.27

## PROVINCE OF MANITOBA

The extraordinary amount of repairs, that the plant has had to undergo last winter, brought up the cost per cubic yard to a pretty high figure, but the work had to be done, in order to maintain the plant in a fair degree of efficiency.

The two scows were practically rebuilt, new side timbers of British Columbia fir were put in, as well as the planking and reframing of both the stern and bows.

The tug "Sir Hector" had also to be rebuilt, a great deal of her hull was renewed, new oak frames as well as new deck beams, oak planking, etc., etc. The cabin was also rebuilt. Leaks in the boiler were patched up, etc. All of which raised the average cost of repairs and likewise the average cost of moving the material per cubic yard. Good work was done for the amount of money expended.

## SESSIONAL PAPER No. 19

## DREDGING—MANITOBA.

CLASSIFICATION OF DISBURSEMENTS of the Dredges operated by the Public Works Department during the year ended June 30, 1900.

## DREDGE "WINNIPEG."

Items.	July	August	September	October	November	December	January	February	March	April	May	June	Grand Totals
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.	\$ cts.
Wages .....	625 00	625 00	603 00	394 41	319 00	301 00	80 00	80 00	324 50	519 72	825 75	630 50	5,387 88
Coal .....	.....	683 45	.....	.....	.....	.....	.....	.....	.....	.....	.....	903 17	1,596 62
Wood .....	.....	30 00	29 10	5 25	.....	.....	.....	.....	.....	.....	.....	.....	64 35
Provisions .....	200 15	176 58	144 63	.....	.....	.....	.....	.....	.....	.....	7 15	291 89	820 40
Stores .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	34 40	31 51	65 91
Equipment .....	202 67	47 00	33 72	36 00	.....	.....	.....	.....	30 45	.....	.....	.....	350 34
Repairs .....	29 57	9 43	7 50	94 58	776 19	53 10	.....	.....	17 65	1,173 75	335 70	356 45	2,853 72
Contingencies .....	21 54	13 00	74 00	18 02	12 90	85	.....	.....	6 75	9 96	12 12	22 60	191 74
Total .....	1078 93	1304 46	891 95	548 06	1108 09	414 95	80 00	80 00	379 85	1,703 43	1,215 12	2,236 12	11,330 96
Working Expenses .....	1049 36	1385 03	884 45	453 68	331 90	361 85	80 00	80 00	302 20	520 68	879 42	1,879 67	8,477 24
Repairs Ordinary .....	29 57	9 43	7 50	94 58	60 90	53 10	.....	.....	17 65	20 40	46 55	45 60	385 08
" extraordinary .....	.....	.....	.....	.....	715 29	.....	.....	.....	.....	1,153 35	280 15	310 85	2,468 64
Total .....	1078 93	1304 46	891 95	548 06	1108 09	414 95	80 00	80 00	379 85	1,703 43	1,215 12	2,236 12	11,330 96

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STATEMENT showing the material removed at different localities, the total annual expenditure on each dredge, and the average cost per cubic yard.

Localities.	Total.
	c. y.
West Slough at West Selkirk.....	21,900
Mouth of Red River (east channel) Lake Winnipeg.....	15,480
Total.....	37,380

Total Jxpenditure during fiscal year 1900. \$11,330.96. Average cost per cubic yard, 30.31 cents.

## PROVINCE OF BRITISH COLUMBIA.

### (a) DREDGING GENERALLY, B. C.

The expenditure under this head includes cost of surveys of Serpentine River and Victoria Harbour, the expenses of tug "Princess" while working for the Marine Department, and clearing snags from Nicomeckle River.

The details of expenditure are as follows:—

Wages.....	\$ 227 85
Provisions.....	225 00
Materials.....	142 38
Survey, Victoria Harbour.....	250 48
Survey, Serpentine River.....	177 05
Total.....	\$1,022 76

### (b) DREDGING, SNAG BOAT "SAMSON."

The snag boat "Samson" was employed during the year in removing snags from the Fraser River between the Chilliwack and the Sand heads, and from the North Arm and Pitt River, also in taking soundings and making survey of mouth of the river and in looking after buoys, etc., marking the channel through the Sand heads at the mouth of the river.

The following is a table showing the number of hours that the snag boat "Samson" was employed at various works during the year ending 30th June last, exclusive of Sundays and holidays:—

Number of snags removed.....	344
Hours Snagging.....	557
" Buoy service.....	595
" Repairs.....	208
" Sounding and surveying.....	190
" Driving piles, etc.....	250
" Coaling, watering, taking on supplies, cleaning boiler, etc.....	1,250
Total.....	1,050

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The running expenses of the snag boat "Samson" were as follows:—

Wages.....	\$ 6,659 54
Provisions.....	1,334 36
Materials.....	871 87
Coal.....	971 63
Wood.....	373 50
Water.....	15 00
Hospital account.....	251 00
* Contingencies.....	65 67
Total.....	\$10,542 57

\* This amount includes washing, etc.

## SNAG BOAT "SAMPSON."

The sum of \$640.51 was expended in repairs to the snag boat "Samson" during the year, divided as follows:—\$168.56 for small minor repairs, and \$471.96 for extraordinary repairs, which included some new timbers and planking on the sides and new canvas over the whole of the upper deck:—

## (c) DREDGE "MUD LARK."

The dredge "Mud Lark" was moved from Nanaimo to Victoria on the 10th of April last, and dredging operations were commenced at the latter place on the 26th of that month and were continued until the end of June, during which time 14,715 cubic yards of hard clay and gravel were removed. This dredging was done at the mouth of the harbour and considerable time was unavoidably lost on account of wind and swell.

The details of expenditure are as follows:—

Wages.....	\$2,311 66
Provisions.....	382 04
* Materials.....	1,623 26
Water.....	9 00
Coal.....	318 83
Total.....	\$4,644 79

\* This amount includes \$1,286.72 paid for repairs to tug "Princess."

## DREDGE "MUD LARK," TUG "PRINCESS," AND SCOWS.

The sum of \$1,345.02 was expended on this service, \$67.90 being used in small minor repairs and \$1,277.12 in general repairs to dredge, tug and scows.

The dredge was hauled out on toe ways at the mouth of the Fraser River and the guides for the bow spud anchors were renewed and repaired, and some small repairs were made, which were found necessary when the dredge was examined after being hauled out. The boiler was also repaired.

The tug "Princess" was placed in the Esquimalt Graving Dock and had a new propeller shaft put in.

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On the 9th of May 1900, the Dredge was ready for work and was taken from Golden to Athalmer, where work was commenced in dredging the Salmon Beds. This was necessary as a new bridge has been put across the river at this point and the channel required widening to allow the steamers to pass with safety through the draw span.—

This work was completed on the 26th June, when the dredge was removed to Peterborough Landing, and an attempt was made to open a channel from the main river to a slough running back of the Peterborough Road, where it comes down from the side hill to the low land in the valley, which is flooded during the summer freshet.—

A party of five men were sent down the river on a scow from Athalmer to cut brush and overhanging trees from the bank of the river to remove snags from the channel, and to cut cord wood at various places along the river for the use of the dredge during the summer, as the Upper Columbia Navigation Co. could not supply the dredge with cord-wood this year as they had done in previous years.

The following are the details of the expenditure in connection with this service :

Wages .....	\$1,854.76
Materials.....	455.88
Provisions.....	527.18
Rent of storehouse.....	100.00
*Contingencies.....	109.45
Total.....	<u>\$3,047.27</u>

\*This amount includes fares, freight, etc.



## DREDGING PLANT.

The following is a summary description of the dredging plant owned and operated by the Public Works Department in the various parts of the Dominion.

## MARITIME PROVINCES.

## The self-propelling elevator dredge " St. Lawrence " (iron hull)—

Length over all.....	175 feet.
Beam.....	30 "
Draft when loaded, aft.....	13.5 "
" " forward.....	8.5 "
Least working depth, (ladder with 32 buckets dropped 30 feet from bow).....	8.5 "
Greatest working depth, (bucket ladder dropped 40 feet from bow).....	28.0 "
Capacity of hopper for spoil material.....	350 cubic yards.
Speed when light.....	6 to 7 miles per hour.
Speed when loaded.....	3 to 4 "
Daily rate of dredging in hard material.....	350 to 700 cubic yds
" " ordinary earth.....	750 to 1,000 "
" " soft material.....	1,050 to 1,400 "

## The self-propelling elevator dredge " Canada " (iron hull).—

Length over all.....	130 feet.
Beam.....	20 "
Draft when loaded, aft.....	11.5 "
" " forward.....	7.0 "
Least working depth.....	7.0 "
Greatest working depth (ladder 24 buckets).....	16.0 "
Capacity of hopper for spoil material.....	90 cubic yards.
Speed when light and newly painted.....	6 to 7 miles per hour
Speed when loaded.....	3 to 4 "
Daily rate of dredging in hard bottom.....	180 to 270 cubic yards
" " with ordinary digging.....	180 to 360 "
" " in soft material.....	360 to 450 "

## The spoon dredge " New Dominion " (wooden hull)—

Length over all.....	90 feet.
Width.....	28 "
Draft.....	5½ "
Greatest working depth.....	21 "
Daily rate of dredging in hard material.....	300 cubic yards.
" " with ordinary material.....	450 "
" " in soft material.....	600 to 700 "
Number of dump scows or barges used.....	4 "

## The spoon dredge " Prince Edward " (wooden hull)—

Length.....	80 feet.
Width.....	28 "
Draft.....	6 "
Greatest working depth.....	20 "
Daily rate of dredging in hard material.....	700 cubic yards.
" " ordinary material.....	500 "
" " soft material.....	600 to 700 "
Number of accompanying dump scows.....	3 "

## The spoon or dipper dredge " George McKenzie " (wooden hull)—

Length.....	90 feet.
Width.....	28 "
Draft.....	5 "
Greatest working depth.....	22 "
Daily rate of dredging in hard material.....	350 cubic yards.
" " ordinary material.....	500 "
" " soft material.....	600 "

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The boom and dipper dredge "Cape Breton" (steel hull)—

Length .....	91 feet.
Beam .....	36 "
Draft .....	7 $\frac{1}{2}$ "
Greatest working depth .....	34 "
Daily rate of dredging in hard material .....	1,000 cubic yards.
" " ordinary material .....	1,500 "
" " soft material .....	2,000 "
Number of barges used (each of 210 cubic yards capacity) .....	2 "

N. B. Tug service performed by hired tugs in the Maritime Provinces.

## SHIP CHANNEL RIVER ST. LAWRENCE, BETWEEN QUÉBEC AND MONTREAL.

The elevator dredge "Laurier" (wooden hull)—

Length over all .....	168.0 feet.
Width of beam .....	32.0 "
Depth of hold .....	14.0 "
Average draught .....	10.5 "
Greatest working depth .....	42.5 "
Daily rate of dredging in hard clay, about .....	1,700 cubic yards.
" " ordinary earth, about .....	3,000 "
" " soft clay (Lake St. Peter) .....	4,000 "

The elevator dredge "Laval" (wooden hull, small buckets)—

Length over all .....	150.0 feet.
Width of beam .....	30.0 "
Depth of hold .....	14.0 "
Average draught .....	11.0 "
Greatest working depth .....	43.5 "
Daily rate of dredging in hard material .....	400 cubic yards.
" " ordinary clay .....	2,000 "

The elevator dredges "Nos. 11" and "12" (wooden hulls)—

Length over all .....	137.0 feet.
Width of beam .....	29.5 "
Depth of hold .....	11.0 "
Average draught .....	8.5 "
Greatest working depth .....	38.0 "
Daily rate of dredging in hard material, about .....	200 cubic yards.
" " ordinary clay .....	2,000 "

The elevator dredge "No. 8" (wooden hull)—

Length over all .....	137.0 feet.
Width of beam .....	29.6 "
Depth of hold .....	11.0 "
Average draught .....	8.6 "
Greatest working depth (short bucket frame) .....	27.0 "
Daily rate of dredging in hard material, about .....	200 cubic yards.
" " soft clay, about .....	1,800 "
" " ordinary clay, about .....	1,200 "

Elevator dredge "No. 4."—

Length over all .....	77 feet 3 inches.
Beam .....	27 feet 0 inches.
Depth .....	6 feet 6 inches.
Built .....	1872.
Engine .....	Horizontal non condensing.
Cylinder ) Diar .....	14 inches.
) Stroke .....	16 inches.
Steam pressure .....	85 lbs.
Capacity of bucket .....	2 $\frac{1}{2}$ cubic yards.
Depth to which dredge can work .....	33 feet.

Rebuilt and altered in 1890.

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## Elevator dredge "No. 7."—

Length over all.....	77 feet 3 inches.
Beam.....	27 feet 0 inches.
Depth.....	7 feet 0 inches.
Built.....	1874.
Engine.....	Horizontal non condensing.
Cylinder ) Diar.....	14 inches
) Stroke.....	16 inches.
Steam pressure.....	85 lbs.
Capacity of bucket.....	1½ cubic yard.
Depth of which dredge can work.....	32 feet.

Rebuilt in 1889.

## The stone lifter "No. 2" (wooden hull)—

Length over all.....	80.0 feet.
Breadth.....	25.0 "
Depth of hold.....	7.9 "
Size of well.....	.22 by 10.0 "

Fourteen dumping scows, the dimensions and capacities of which are as follows—

No. of Scows.	Length.	Breadth.	Depth of Hold.	Capacity.
1.....	60 feet.	16 feet.	6½ feet.	60 cubic yards.
7.....	80 "	16 "	7 "	75 "
2.....	84 "	20 "	8 "	150 "
2.....	90 "	18 "	7 "	150 "
2.....	95 "	23 "	8½ "	200 "

## The coal barge "Caroline"—

Length over all.....	103.7 feet.
Breadth.....	22.5 "
Depth of hold.....	8.3 "
Capacity.....	250 tons.

## The coal barge "Waverly"—

Length over all.....	100.0 feet.
Breadth.....	20.9 "
Depth of hold.....	7.1 "
Capacity.....	250 tons.

## The coal scow "No. 1"

Length over all.....	80.0 feet.
Breadth.....	16.0 "
Depth of hold.....	4.5 "
Capacity.....	80 tons.

## The coal scow "No. 2"

Length over all.....	54.0 feet.
Breadth.....	18.0 "
Depth of hold.....	4.0 "
Capacity.....	60 tons.

## The sounding scow—

Length over all.....	60.0 feet
Breadth.....	25.0 "
Depth of hold.....	4.5 "

## The winch scow "No. 1"

Length over all.....	54.0 feet
Breadth.....	18.0 "
Depth of hold.....	4.0 "

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The winch scows "No. 2"—

Length over all.....	50.0 feet.
Breadth.....	19.0 "
Depth of hold.....	4.0 "

The above ship channel plant was attended in 1899-00 by the tugs "John Pratt," "St. James," "St. Francis," "C. J. Brydges," "M. J. Parsons," "Cartier," "St. John d'Iherville" and "Emelia."

The spoon dredge "St. Louis" (wooden hull)—

Length.....	50.0 feet.
Width.....	14.0 "
Depth of hold.....	4.0 "
Draft.....	2.5 "
Greatest working depth.....	12.0 "
Daily rate of dredging in hard-pan, etc.....	50 cubic yards.
" " " in soft material.....	300 "

Dredge attended by tug "Daisy" with two dump scows, having a capacity of 30 cubic yards; plant used only for light digging.

A twin stone lifter (catenaran style)—

Length of each wooden hull.....	42.0 feet
Width.....	8.5 "
Depth of hold.....	3.0 "
Draft.....	1.0 "
Distance between hulls.....	7.0 "

One wooden scow for reserve and supply for Q. &amp; O. dredging fleet—

Length.....	50.0 feet.
Breadth.....	17.0 "
Depth of hold.....	8.3 "
Draft when loaded.....	6.0 "
Capacity.....	100 tons.

## QUEBEC AND ONTARIO.

The elevator dredge No. 9 (wooden hull)—

Length.....	137.0 feet.
Width.....	20.0 "
Depth of hold.....	11.0 "
Draft.....	9.0 "
Greatest working depth.....	38.0 "
Daily rate of dredging in hard material.....	200 cubic yards.
" " " in soft ".....	2,000 "

Dredge attended by tug "Delisle" with two dump scows, each of 80 cubic yards capacity.

The dipper dredge "Queen" (wooden hull)—

Length.....	65.3 feet.
Width.....	25.0 "
Depth of hold.....	5.0 "
Draft.....	3.0 "
Greatest working depth.....	16.0 "
Daily rate of dredging in hard material.....	200 cubic yards.
" " " in medium firm material.....	400 "
" " " in soft material.....	600 "

Dredge attended by tug "Ottawa" with two dump scows, of 60 cubic yards capacity.

The dipper dredge "Nipissing" (wooden hull)—

Length.....	70.7 feet.
Width.....	25.0 "
Depth of hold.....	6.0 "
Draft.....	4.5 "
Greatest working depth.....	20.0 "
Daily rate of dredging in hard-pan, etc.....	300 cubic yards.
" " " in stiff clay.....	500 "
" " " in soft clay and sand.....	800 "

Dredge attended by tug "St. Paul" and two dump scows, of 75 cubic yards capacity.

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The dipper dredge "Ontario" (wooden hull)—

Length.....	71.0 feet
Width.....	25.0 "
Depth of hold.....	6.0 "
Draft.....	4.5 "
Greatest working depth.....	20.0 "
Daily rate of dredging in hard material.....	300 cubic yards
" " in medium firm material.....	500 "
" " in soft clay and loose sand.....	800 "

Dredge attended by tug "Sir John" with two dump scows, of 60 cubic yards capacity.

The dipper dredge "Challenge" (wooden hull)—

Length.....	70.5 feet.
Width.....	25.0 "
Depth of hold.....	6.0 "
Draft.....	4.5 "
Greatest working depth.....	21.0 "
Daily rate of dredging in hard material.....	300 cubic yards.
" " in medium firm or ordinary earth.....	500 "
" " in soft clay and loose sand.....	800 "

Dredge attended by tug "Trudeau" with two dump scows, having a capacity of 60 cub. yds.

## MANITOBA.

The dipper dredge "Winnipeg" (wooden hull)—

Length.....	71 feet.
Width.....	25 "
Depth of hold.....	6 "
Draft.....	4.5 "
Greatest working depth.....	20.0 "
Daily rate of dredging in hard material.....	300 cubic yards.
" " ordinary earth.....	500 "
" " soft clay and loose sand.....	800 "

Dredge attended by tug "Sir Hector" with two dump scows, having a capacity of 60 cubic yards, and a coal barge.

The "Priestman" dredge.

The steamer "Victoria."

## BRITISH COLUMBIA.

The dipper dredge "Mud Lark" (wooden hull)—

Length.....	90.0 feet.
Width.....	30.0 "
Depth of hold.....	7.9 "
Draft.....	4.6 "
Greatest working depth.....	40.0 "
Daily rate of dredging in hard pan and hard gravel and boulders.....	300 to 400 cubic yds.
" " medium hard earth.....	500 to 600 "
" " soft material, mud, etc.....	800 "

Dredge "Mud Lark" attended by tug "Princess" and three dump scows.

The self-propelling stern wheel, clam-shell dredge "Muskrat"—

Length.....	60.0 feet.
Width.....	30.0 "
Depth of hold.....	3.3 "
Draft.....	1.7 "
Daily rate of dredging in loose gravel, etc., the only kind of material which has been worked so far.....	300 cubic yards.

The "Muskrat" works with two scows in attendance.

The snag-boat "Samson" and one scow.

The snagging scow built for use on the Fraser while the "Samson" was operating on the Stikine.

## GRAVING DOCKS.

The Dominion Government owns and maintains three graving docks, viz :—The Lorne Graving Dock, at Lévis, in the Province of Quebec; the Kingston Graving Dock, at Kingston, in the province of Ontario; and the Esquimalt Graving Dock, at Esquimalt, near the city of Victoria, in British Columbia.

## LÉVIS DRY DOCK.

The town of Lévis is situated on the south shore of the St. Lawrence, opposite the city of Quebec.

*Construction.*—In 1878 the construction of a dry dock was commenced by the Harbor Commissioners of Quebec at St. Joseph de Lévis or Lauzon, a village two miles below the city of Lévis. The amount required for the prosecution of the work was loaned by the Dominion Government to the Commissioners of the Harbour of Quebec, under the authority of the Act 38 Victoria, chap. 56, assented to on April 8th 1875.

The dock was completed in 1886, at a cost of \$910,000.00; on September 1st of that year, the S. S. "Titania" was docked therein.

The dock became a public work of the Dominion of Canada under authority of the Act 50 Vic. chap. 6, assented to on May 22nd 1888, which also released the Quebec Commissioners from all obligation to repay to the Government of Canada the whole or any part of the advances made to them towards the construction of the work or any sums in payment of the interest thereon. The dock came under the control and administration of the Department of Public Works on October 17th 1890.

The general plan of the dock is a rectangular figure, 445 feet long, 100 feet wide at coping level and 73 feet wide at the bottom, with a circular head 31 feet radius. Square offsets of 19 feet on each side from the top, width of the timber slides and stairs, which are placed in pairs, side by side, at both ends. The width of the inner invert, between the main body of the dock and the caisson berth is 8 feet, making the total length of the dock, inside the first meeting face of the caisson, 484 feet.

The depth of water on the sill is 26½ feet at the high water spring tides and 20½ feet at high water neap tides.

The entrance of the dock is 62 feet wide, and it closes by a caisson travelling on rollers, worked by a pair of high pressure auxiliary engines of 34 horse-power. These engines also work the small pump with a capacity of 900 gallons per minute, which is used to clear the drainage well, the dock is constantly kept dry with this pump. The main pumps, two in number, are of the ordinary style of lift pumps, 4 feet in diameter and 5 feet stroke, and discharge 14,000 gallons per minute. They are worked by a pair of jet condensing engines, 27½ inch cylinders with 36-inch stroke, and of 400 horse power. Steam is supplied by three tubular boilers, 14 feet 10 inches in length and 6 feet in diameter.

The dock proper is built of the best quality of limestone from the Terrebonne quarries, the courses being exceptionally heavy and laid in Portland cement. It is lighted by 12 arc lamps supplied from a Thomson & Houston dynamo, so that vessels can be docked at night and work carried on without interruption.

The following is a statement showing the number of vessels docked, the cost of maintenance and repairs, and the amounts collected during each fiscal year from the time the control of the dock was assumed by the government up to and including the present fiscal year. Under the head of repairs and improvements are

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set down the amounts expended for such works and additions as could not be performed by the ordinary staff of the dock. In all cases the cost of small repairs and ordinary care of the machinery is included under the head of maintenance.

Fiscal Year.	Number of vessels docked.	Repairs and Improvements.	Maintenance.	Revenue.	Remarks.
		\$ cts.	\$ cts.	\$ cts.	
1888-89	3	.....	4,065 67	2,349 60	Ordinary care and small repairs.
1889-90	5	2,104 90	9,331 74	17,498 99	Cleaning, painting, repairs to machinery.
1890-91	5	6,286 24	5,005 31	18,003 52	Iron beams placed under the bearings of the shaft of the main pumps, machinery painted and generally overhauled, a quantity of gravel and stones removed by one of the departmental dredges, assisted by a stone lifter, from the shoal off the entrance of the dock
1891-92	3	4,981 35	8,298 76	4,384 97	Sluice valves in caisson and culverts taken off their seats, cleaned of all dust and replaced inside of caisson scraped and two coats of cement wash applied; outside of caisson and folding bridge painted and joints in masonry of dock repointed. General and thorough repairs to engines and auxiliary pumps and boilers.
1892-93	11	2,626 03	7,838 47	13,306 43	Engine house and shop painted three coats; caisson placed in chamber, and bottom and lower portion of sides and ends scraped and painted two coats; timber facing repaired to ensure close joint with invert and side walls
1893-94	8	.....	7,967 07	13,310 94	Stone foundation for coal shed built, shed not completed
1894-95	7	.....	8,321 62	13,795 19	Coal shed completed, ordinary care to machinery
1895-96	8	.....	9,205 80	8,835 39	Caisson berth and recess cleaned of sediment, bottom, sides and ends of caisson scraped of all dust and painted two coats.
1896-97	7	.....	7,718 88	12,346 57	Head and side of dock levelled back of coping and drain put in; 40 staging planks 130 horizontal timbers purchased.
1897-98	7	.....	6,148 32	19,839 97	Ordinary care and repair to pumping machinery and caisson.
1898-99	8	.....	7,235 88	13,786 09	Stringers of caisson folding bridge were replaced by iron girders; the planking of the folding bridge and over the caisson chamber was renewed; 800 feet of 2½ inch hose were purchased to replace that which had been in use for 9 years; ordinary care to machinery.
1899-00	3	.....	5,096 17	9,860 21	
	75	76,088 52	87,733 69	147,377 87	

The amount of \$3,307.62 expended for maintenance and repairs during the first six months of the year may be subdivided as follows:

Staff .....	\$1,925.81
Labourers.....	350.51
Coal, oil, waste and small repairs.....	1,031.30

\$3,307.62

During the first six months of the last fiscal year the dock was kept in excellent working condition with the ordinary care and slight repairs to the caisson and pumping machinery.

On the 23rd October 1899, a contract was entered into with Mr. Powers of Levis to lengthen the dock by 116 feet, in order to obtain a total length of 600 feet, the work was being proceeded with when the writer was transferred to Ottawa from his position of Dock Master, in the month of February 1900.

The total amount expended on this work is \$1,012,033.67 made up of \$910,000 for construction, and \$102,033.66 for maintenance and repairs.

#### KINGSTON DRY DOCK.

Kingston is situated at the outlet of Lake Ontario, 172 miles west of Montreal, and is an important commercial centre.

*Construction.*—In 1888 the construction of a dry dock, located near the centre of Kingston harbour was commenced and was completed in 1892, at a cost of \$461,097.72.

It is built of limestone laid in cement mortar; has good yard accommodation, and can take in any vessel that passes through the Welland canal; the depth of water on the sill being  $14\frac{1}{2}$  at low water, and  $16\frac{1}{2}$  feet at high water.

The general plan of this dock is a rectangular figure. The length from the foot of the stairway, at its head over the keel blocks, and up to the inner invert is 280 feet. This invert is 10 feet wide, hence from the inner side of the caisson to the foot of the stairs the distance is 290. By placing the caisson gate out on the apron the last mentioned length can be increased by 23 feet to 313 feet. The length at coping level from the outer end or lake face of the wing walls of the dock to the top of the stairway at its head is 370 feet. The width of the dock between walls is 47 feet at floor level and 70 feet at coping level. Its depth from the top of coping to the floor at the sides is 20 feet 6 inches, the radius of the inverts being 193 feet. The rudder well commences at 10 feet from the face of the inner invert and is  $2\frac{1}{2}$  wide, 24 feet long, and 12 feet long keel blocks are placed at 5 feet centres from end to end of the dock; there are also 32 bilge blocks at 10 feet centres on the floor of the dock.

The caisson is 59 feet in length on long face, 57 feet on short face, 13 feet wide by 22 feet deep. It is operated by a worm gear arrangement in connection with the auxiliary engines hereinafter alluded to.

The large steam boilers (battery of 4) are connected and provided with controllidg valves, so that one or more of them may be used at the same time. The length of the shell is 14 feet, each boiler has  $83\frac{1}{3}$  inch flues of the same length as the shell, diameter 5 feet 6 inches; thickness of plates  $\frac{3}{8}$  inch. Pressure of steam carried, 100 pounds to square inch.

The small auxiliary boiler is of the drop flue type. The shell, which is 9 by 4 feet, plates  $\frac{3}{8}$  inch thick, has 250 drop flues  $1\frac{1}{4}$  by 18 inches, with circulating tubes. This boiler saves from 50 to 75 per cent of the fuel required to keep up steam in one of the large boilers for general purposes, when the main pumps are not being operated.

The main engines two in number, are of the vertical high pressure type, the cylinders being 18 by 18 inches. These engines operate the main pumps.

The main pumps are of the centrifugal type, having each a 20 inch diameter discharge, and jointly capable of discharging 30,000 gallons per minute against a head of 33 feet.

The auxiliary engines are of the vertical high pressure type. The two cylinders are each 12 by 12 inches. These engines operate the auxiliary pump and the caisson.

The fire pump was made by Knowles Co., of Boston; its steam cylinder is 15



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by 21 inches and the water cylinder 10 by 21 inches. This pump can be used to do the duty of the auxiliary pump, should the latter be disabled.

The pony engine and pump has two steam cylinders, each 6 by 7 inches; its water cylinder is 4 by 7 inch. This pump is used for feeding the water supply to the boilers and for sprinkling purposes, and is capable of supplying 3,000 gallons per minute against a head of 32 feet.

A large steam derrick is used for lifting purposes in connection with docking operations and repairs.

Beside the machinery building which is of stone, and measures 84 by 36 feet, exclusive of chimney 15 by 15 feet at the base; a wooden metal cased shed, 30 by 40 feet, has been erected to the southward of the said building for the storage of coal. The dock property is inclosed by a wooden fence of the best description, 868 feet long, with gates on Gore and Union streets.

During the fiscal year this dock was maintained in good working condition, ordinary care being bestowed on the pumping machinery, caisson, derrick, &c. No new work was undertaken.

Electric lights and a ship carpenter's shed are wanted to complete the full equipment of the dock.

The following is a statement showing the number of vessels docked, the cost of repairs and maintenance, and the amounts collected during each fiscal year since the dock is in operation, up to and including the present fiscal year. Under the head of "Repairs and improvements" are set down the amounts expended for such works and additions as could not be performed by the ordinary staff of the dock. In all cases the cost of ordinary care and small repairs to the machinery is included under the head "maintenance."

Fiscal Year.	Number of vessels docked.	Repairs and Improvements.	Staff and Maintenance.	Revenue.	Remarks.
		\$ cts.	\$ cts.	\$ cts.	
1891-92	21	442 33	4,978 90	2,105 70	A travelling crane erected in the engine room, 32 bilge blocks with the necessary hauling chains placed in position.
1892-93	51	48,612 54	8,033 91	6,196 49	A vertical boiler 4 feet in diameter, by 9 feet in height was purchased. Fire pump removed from upper to lower floor of engine room. A shed for storage of coal was built, also a wooden fence 868 feet in length around the dock property.
1893-94	44	782 97	6,607 46	7,453 01	Minor repairs.
1894-95	24	.....	5,939 51	2,878 23	Steam derrick painted; stone work pointed with Portland cement. Wood work of engine house painted, etc.
1895-96	65	925 00	5,357 16	3,954 78	Putting in sprocket wheels and chains in lieu of old drums and cables for operating the caisson, etc.
1896-97	58	.....	4,657 10	6,360 60	Minor repairs.
1897-98	35	.....	4,733 79	7,448 31	Painting coal shed and caisson; levelling dock premises; concreting engine room floor, etc.
1898-99	59	.....	5,046 70	7,506 88	Minor repairs and ordinary care to machinery.
1899-00	28	4,744 71	4,792 46	4,113 83	Building carpenters' shed; repairing wharfs, etc., putting in electric light apparatus, etc., new safe.
	385	55,463 55	50,146 99	48,017 83	

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The expenditure of \$4,700.71 incurred during the fiscal year for repairs and improvements is subdivided as follows :—

Expenditure, building repairs, &c.

Repairs to derrick No. 1465, June 17th 1899.....	\$ 450.00
Building Ship Carpenter's shed.....	2,033.84
Building w. c. and repairing wharfs and piers.....	1,265.97
Putting up electric lighting apparatus.....	772.90
New safe for office.....	178.00
Total.....	\$4,700.71

The expenditure of \$4,792.46 for working is as follows :—

Staff.....	\$ 2995.00
Fuel.....	1114.25
Offer rent.....	150.00
Telephone.....	25.00
Water.....	10.00
Sundries repairs.....	498 21
Total.....	\$ 4792.46

Dock, buildings, machinery, wharfs, piers, etc ; all in good order. Electric lighting very satisfactory.

### ESQUIMALT GRAVING DOCK.

Esquimalt, in the electoral district of Victoria, is situated on the Straits of San Juan du Fuca, about 3 miles from the city of Victoria.

*Construction and description.*—This dock is built in a small cove in Esquimalt Harbour. It was commenced by the provincial government of British Columbia, but the work was taken over by the Dominion Government while being proceeded with, and the dock was completed and opened in July, 1887.

The principal dimensions of the dock and caisson gate may be stated as follows :—

	Feet.	Inches.
Length of dock over keel blocks.....	430	0
Width of inner invert .....	20	0
Width of caisson chamber.....	15	10
Width of outer invert .....	15	0
Total length of dock.....	480	10
Width of dock at coping level.....	90	0
Width of dock at entrance.....	65	0
Width of floor of dock.....	41	1
Radius of inverts.....	16	6
Total depth of rock above inverts.....	33	6
Height of inverts above floor of dock.....	3	0
Height of keel blocks.....	2	10
Length of keel blocks.....	4	0
Length of caisson (inside facing).....	67	0
Length of caisson (outside facing, reversible)....	15	8

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At low water the depth on the invert is 24 feet 6 inches, and at an ordinary high water 26 feet 6 inches.

The following is a summary description of engines, boilers, pumps, electrical and diving apparatus, hoisting and handling machinery, buoys, lathes, other machine tools and appliances, and supplies required for repairing, fire fighting and other purposes which are available for use at this station :—

- Two condensing engines, cylinders 27 inches in diameter, 36-inch stroke.
- Two lifting pumps, cylinders 48 inches in diameter, 60-inch stroke.
- Three Cornish boilers, 6½ feet in diameter and 14 feet in length.
- One high pressure auxilliary engine, cylinder 16 inches in diameter, 20-inch stroke.
- One centrifugal drainage pump, 14-inch suction, 12-inch discharge.
- One return tubular boiler, 5 feet 3 inches in diameter and 14½ feet in length.
- One handling engine for caisson, cylinder 12 inches in diameter, 14-inch stroke.
- One centrifugal drainage pump, 6-inch suction, 5-inch discharge.
- One Edison No. 4 dynamo, 1,600 C. P., 16 lamps around dock.
- One engine for dynamo, 8 inches in diameter by 12-inch stroke.
- One iron movable stop-gate for caisson chamber.
- Twenty-five iron bollards around dock.
- One wooden crane, 10 tons capacity.
- Eight hand capstans.
- Six hydrants.
- Three hose reels and 200 feet of canvas hose.
- One diving apparatus complete.
- One lathe, 6 foot bed.
- One drilling machine.
- One set of taps and dies complete.
- One steam box for bending planks.
- Two iron warping buoys.
- Two dolphins to mark channel at entrance of dock.

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The following is a statement showing the number of vessels docked, the cost of repairs and maintenance, and the amounts collected during each fiscal year since the dock is in operation, up to and including the present fiscal year.

Under the head of repairs and improvements are set down the amounts expended for such works and additions as could not be performed by the ordinary staff of the dock. In all cases the cost of ordinary care and small repairs to the machinery is included under the head of maintenance :

Fiscal Years	Number of Vessels Docked.	Construction.	Repairs and Improvements.	Staff and Maintenance.	Revenue.	Remarks
		\$ cts.	\$ cts.	\$ cts.	\$ cts.	
1882-3	1	1,149,146.25				Cost of construction, including \$250,000 refunded by the Imperial Government
1882-3	6			6,342.63	5,337.46	Electric lights installed, &c.
1883-4	18		8,571.22	12,720.10	14,811.86	Electric lighting completed ; a lathe and drill set up ; a small centrifugal pump substituted for the auxiliary pump ; sheds for the fire-hose carts erected, &c. Some dredging done.
1884-5	10		7,150.00	12,719.94	13,563.62	New keel blocks, hand rails, staunchions, &c., provided, and minor repairs effected by dock staff.
1885-6	20		2,639.65	12,725.90	19,603.14	A coal shed, 58 x 36 feet, erected ; general repairs and improvements by dock staff.
1891-2	18		2,410.49	14,232.47	18,416.25	Pump wells and foundations for machinery repaired ; a large portion of engine-room floor, which had been cracked by settlement, was re-laid with Portland cement concrete, and wall of engine-house facing dock pulled down and rebuilt. In addition many minor repairs were done
1892-3	11		8,859.78	13,196.61	23,204.38	A leak in the caisson chamber repaired, and minor improvements and repairs made.
1893-4	7			10,075.59	10,786.70	Caisson scraped, painted and machinery generally overhauled.
1894-5	11			10,419.76	6,320.25	General repairs, painting, &c.
1895-6	15			12,355.09	10,221.68	Spur driving wheel of main pumps, which had been broken, was replaced by a new wheel. A planer added to the equipment, and necessary repairs and renewals made.
1896-7	13			10,770.28	7,514.80	Ordinary repairs painting.
1897-8	14			11,745.84	6,233.52	Repairs. Furnace shed enlarged and brick drain built.
1898-9	29			11,957.05	10,315.53	Ordinary care to machinery.
1899-00	20			13,251.34	6,891.62	Ordinary repairs and small improvements.
Totals...	202	1,149,146.25	29,631.14	152,512.60	163,220.79	

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During the year the dock has been kept in good running order.

The total expenditure for the year amounts to \$13,251.34.

The greatest number of vessels docked, during the year, belonged to the Royal Navy.

The dock was occupied 109 days.

## RIVIERE DU LIEVRE LOCK AND DAM.

The Rivière du Lièvre flows through the county of Ottawa, and empties into the Ottawa River at Buckingham station on the Canadian Pacific railway, 18 miles below Ottawa.

The magnitude of the trade and business done on this river, previous to the completion of the lock and dam at Little Rapids, may be judged from the following return of the output of timber and phosphate for the twelve months ended June 30th, 1888 :—

Railway ties.....	40,000
Cedar posts .....	30,000
Square timber (cubic feet).....	154,395
Lumber (B.M) .....	46,500,000
Phosphate (tons).....	27,537
Mica (lbs).....	10,000
Feldspar (tons).....	50

The river was then navigable at high water from the village of Buckingham to High Falls, a distance of 22 miles. But, during low water, navigation was practically stopped at the foot of Little Rapids, a distance of 12 miles above the village of Buckidgham. Various amounts, aggregating \$10,053.68 were expended from 1881 to 1887, in improving the navigation of the river to High Falls; boulders and ledges of rock were blasted and removed from the bed of the channel through the Long Rapids, situate 7½ miles above the Little Rapids. The channel through the latter was also improved in a similar manner and a floating stage carrying a double-gearred winch, was placed at its head to facilitate the passage of barges carrying phosphate. Notwithstanding those improvements, navigation still remained unsatisfactory. A careful survey of the locality was then made, and it was ascertained that any further deepening of the channel through the Little Rapids would tend to lower the level of the water in the upper reaches of the river, and render the driving of logs impossible at any other time than during the very highest stages of the waters.

*Construction.* The construction of a lock and dam at the Little Rapids was therefore decided upon and a contract for the execution of the works was entered into with Messrs. Poupore & Co., in December, 1886, and completed in April, 1892, at a total cost of \$233,658.65.

The lock is situate on the east shore of the river. It is built of cut stone masonry in cement mortar, 150 feet long between the gates, 32 feet 6 inches wide at the bottom with eight feet of water on the mitre sills, and a lift of 13 feet 9 inches at extreme low water. Along the western face of the work a retaining wall was built and was carried 143 feet above the upper end of the latter to serve as a guide pier to the upper entrance. The dam, which is built of close-faced cribwork, is 270 feet long and 34 feet wide at the bottom; it starts from the western face of the retaining wall opposite the upper gates of the lock, and crosses the streams to the western abutment, which is 65 feet long and 40 feet wide. Through its centre a timber slide 18 feet wide was built for the passage of timber and logs, and booms were strung from the opening to mooring piers placed on each shore of the river 290 feet above the dam.

*Repairs.*—During the year 1893-94 some necessary repairs were made to the west abutment of the dam and to the lower wharf at a cost of \$102.65. In 1894-95,

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\$267.70 was expended in building a protection pier above the west abutment of the dam, to prevent the river from working its way back of this abutment during the spring freshets. In 1895-96 some minor repairs were made in filling holes and depressions in the west embankment, which was sinking in some places and required levelling, at a cost of \$115.00. In 1896-97, the upper portion of the lower entrance wall which had bulged out about 14 inches for a length of 100 feet from the masonry of the lock, was taken down and a new wall, 135 feet long by 25 feet wide, built in its place. This bulge was getting worse every year, and it was feared that the pressure of the earth backing would soon cause it to collapse and block the lower entrance of the lock. The crib, 43 feet by 22 feet, built at the head of the western abutment, to prevent undermining was also completed. This crib imperfectly fulfilled its object, a quantity of water still making its way underneath the abutment, and it was found necessary to remove this source of danger by adding three feet to the height of the crib, fully ballasting it and sheathing its outer face from top to bottom. The cost of these repairs amounted to \$1,824.39. In 1897-98 the sum of \$4,419.94 was expended in rebuilding the retaining wall from the dam to the upper end of the guide pier, a distance of 226 feet, in close face cribwork from the low water level to an elevation of 10 feet with a width of 26 to 32 feet. This reconstruction was absolutely necessary to protect the lock wall, as the face timbers of the retaining wall were gradually being pressed out by the stone ballast, the dovetails of the cross ties having split and decayed, and the cross ties being bent and broken.

The following is a statement showing the cost of the work, repairs and maintenance, and the amounts collected during each year, up to and including the fiscal year 1899-00.

Year.	Cost of Construc- tion.	Repairs and Improve- ment.	Mainte- nance.	Revenue.	Remarks.
	\$ cts.	\$ cts.	\$ cts.	\$ cts.	
1887-88..	43,329 04				Lock and dam in course of construction.
1888-89..	64,506 74				" "
1889-90..	50,280 50				" "
1890-91..	40,019 14				Masonry of lock completed and work on dam progressing rapidly.
1891-92..	35,247 72		193 52		Lock and dam completed and first boat locked on the 19th of April.
1892-93..	275 51		952 86	243 87	Building 400 feet of booms.
1893-94..		102 65	768 21	532 50	
1894-95..		267 70	840 34	404 30	
1895-96..		115 00	851 60	230 33	
1896-97..		1,824 39	790 79	198 45	
1897-98..		4,419 94	736 19	246 84	
1898-99..			1,579 85	296 80	
	233,658 05	6,729 08	6,713 36	2,133.18	

From the foregoing statement it will be seen that the revenue collected has diminished every year, the shrinkage being caused by the suspension of operations on the phosphate mines and the closing up of Messrs. Grandin & Racicot Co's. saw mill.

Owing to the flooding of land caused by the construction of the dam, amounts aggregating \$4,559.04 were paid for damages.

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The total expenditure incurred in connection with this work is as follows:—

Construction.....	\$233 658.65
Repairs.....	6,729.68
Staff and maintenance.....	8,866.54
Claims for damages, etc.....	4,559.04
Total.....	\$253,813.91

During the year 1893-94, after the construction of the lock, the sum of \$1,244.94 was expended in removing boulders obstructing the channel through the long rapids.

The repairs executed last year consist of a stonewall 213 feet long, 12 feet wide, 6 feet high in front and 12 feet in the rear which was built on west side of river, below the dam, to protect the bank.

On east side of river three rounds of new timber, 145 feet in length and 10 feet in width were placed on pier commencing below the dam; a stone wall 142 feet in length, 5 feet in height and 12 feet in width was also constructed. Some other minor repairs were made.

## YAMASKA LOCK AND DAM.

This river takes its rise in the township of Bolton, in the county of Brome. It forms an outlet for several large lakes, and has a course of about 90 miles. It flows through the counties of Brome, Missisquoi, Rouville, Bagot, St. Hyacinthe, Richelieu and Yamaska, and empties into the head of Lake St. Peter on its southern side, 8 miles below Sorel.

A contract for the construction of a lift lock and dam at Ile à Cardin, one mile and three-quarters below the village of St. Michel de Yamaska, and about four and a half miles from the mouth of the river, was entered into in 1881. This work was completed in 1886; it gives a rise of 5 $\frac{3}{4}$  feet.

By the construction of those works, and by dredging done subsequently on the shoal below the lock, the river has been rendered navigable for vessels of moderate draught up to Belle Point, or Rapide de la Grosse Roche, a distance of 20 miles.

When 170 feet of the dam was carried away in 1890, the broken portion was renewed and built two feet lower than the remaining part of the dam so as to prevent the lock from being immersed at each freshet.

During the fiscal year 1899 the dam was raised to a uniform height, and 345 feet of the planking were renewed with 4-inch tamarack.

Stone ballast was put in the work where necessary.

## SLIDES AND BOOMS

The Dominion Government owns and operate slide and boom works built to facilitate the passage of square timber, round logs flatted and dimension timber, &c., on the River Ottawa and tributaries, on the lower 40 miles or so of the St. Maurice, and in the Trent and Newcastle District between Fenelon Falls and Heeley's Falls.

In the subjoined reports, the superintending engineers of these river works, Messrs. G. P. Brophy, F. X. Thos. Berlinguet and R. B. Rogers, give particulars relative to the works of construction, improvement and repair carried out under their supervision on government slides, booms, piers, dams, streams, buildings, &c., during the fiscal year, the expenditures incurred for staff, maintenance,

improvements, &c., the quantities of the various descriptions of timber that pass through their works, the revenue accrued from toll levied on the said timber, and other information of general interest and utility to lumbermen and the public at large.

## REPORT ON THE OTTAWA RIVER WORKS.

(By G. P. BROPHY, SUPERINTENDENT ENGINEER.)

The Acting Chief Engineer  
of the Public Works of Canada,  
Ottawa.

Sir:—As requested by you in your communication No. 2393, dated 9th July last, I have the honour to submit the following report on the works under my charge on the Ottawa river and certain of its tributaries, for the fiscal year ended 30th June 1900.

After the "drives" of the season of 1899 had passed, the foundations of the various river structures were examined and advantage taken of the lowest pitch of water to commence the necessary repairs, which were continued and completed during the winter and early spring months, and may be described as follows:—

### REPAIRS AT STATIONS ON THE OTTAWA RIVER, (Main Stream)

*Hull or North Chaudiere Station.*—The top timbers of side pier on north side of upper slide were repaired, the booms and aprons overhauled and their fastenings adjusted from time to time; rubbish removed from reserve and a tool house erected. During the winter months ice was cut from around booms to relieve them. At the Lower Slide, missing planks in bottom were replaced. The bulkhead and waste gate piers at this slide were rebuilt from low water mark and a new bulkhead platform and crab frame provided. Additional stone filling was placed in the pier dam adjacent to the waste gate on west side and the rear timbers of this dam were also repaired where found decayed. After the disastrous fire on 26th April last, considerable debris had to be removed from the slide channels before logs and dimension timber could be passed through the works. The booms and aprons were also adjusted and repaired where damaged by fire.

*Ottawa or South Chaudiere Station.*—The enlargement of storehouse at this station was completed; the roofs of the sheds were repaired; the building on side pier of slide was jacked up and strengthened; the crossing over slide leading to storehouse yard was rebuilt; the nuts of bolts on apron were tightened up and planks planted on apron fingers to prevent abrasion from passing timber. As the water in slide and hydraulic channels varied in height from day to day the booms and aprons had to be protected by cutting ice and adjusting chains etc. The side piers of Second Slide were covered in part with 3 in. sheeting and at the entrance to this slide a new section of boom 40 ft in length, 3 sticks in width and one deep was built and well secured by spikes and bolts. As at Hull Station, the works at Ottawa side suffered severely by fire of 26th April last. The storehouses, sheds, tools, etc., were completely swept away; the tops of side piers of slide, bulkheads etc., were all damaged. These had to be repaired temporarily, sheds built for tools and burnt materials removed from slide channels etc, to admit of passing square timber.



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*Chats.*—The repair work at this station consisted of rebuilding upper portion of snubbing pier at head of Chats Rapids, which had been carried off by an ice shove; and spiking 1503 ft B.M. of elm plank in bottom of slide; 2 rock elm stop logs were also provided to replace others worn out.

*Portage-du-Fort.*—The support pier at upper end of guide boom was rebuilt 12' x 20' x 12' high; a new section of double boom, 135 feet in length was built below this pier and damaged portions of slide piers on both sides were repaired (length 50' x 10' wide and 4 courses high).

*Mountain.*—A break immediately below the second bulkhead of slide was repaired, new sills and flooring being laid; a section of the flooring in bottom at outlet of slide about 60 feet in length was renewed; damaged sheeting in bottom was patched in many places throughout the whole length of slide, and at places in side walls where gouged out, a filling of hardwood plank was inserted. The north side pier of slide at extreme lower end was repaired. This pier forms a dam facing chute and the sloping surface on top was renewed, new fingers were laid and on top of these the covering of 6 inch elm was fastened. Two different sections were treated in this way, one 75 feet in length by 7 feet wide and the other 55 feet long by 20 feet wide. A broken length of double boom, 60 feet at head of slide, was also renewed.

*Calumet.*—At this station, the cribwork forming side of third slide, next the island, was partially displaced by spring floods. The damaged portion 80' x 10' in height was taken down and rebuilt. A deposit of loose stones was removed from timber channels below the slide. A washout occurred at upper end of controlling dam near third slide; the dam was extended up stream a distance of 20 feet to solid rock; the rear portion of this dam was also repaired, where damaged and a quantity of extra stone filling placed in square crib forming base. The sheeting in bottom of third slide was patched where worn thin. The covering on long dam forming basin, between second and third slides, was repaired where damaged by logs and ice. A pier supporting guide boom at entrance to first slide was repaired; the corners had become rotten and worn away; these were sheeted with plank and extra fenders put on to protect the pier from damage by ice-shoves and driftwood.

## TRIBUTARIES OF THE OTTAWA.

*Gatineau River.*—The repairs on this stream were done principally to the piers supporting the main boom; piers Nos. 3 and 4 were sheeted with 3 inch plank on all sides, and had additional stone filling placed in them. A pier at "trip" immediately below the Canadian Pacific Railway Bridge, had become cantled, owing to the foundation having been scoured out by the current of the river. A quantity of stone was deposited around the pier at base to prevent further settlement. A pier at extreme upper of boom was rebuilt in its five upper courses and stone filled. Various other piers were also repaired, fenders being added and stone filling placed in cribs. The chains, clevises, pickets links, caps, etc., of the boom were also repaired and adjusted, while some minor repairs were made to fences and to station house.

*Madawaska River.* At Arnprior a section of side pier of slide on east side immediately below bulk-head was rebuilt, 80 ft. long x 11 ft. average width by 5 ft. high. Four courses of a boom pier 11' x 15' at entrance to slide were rebuilt and a false bottom was put in this pier to contain stone filling. Another pier 14' x 24' on west bank of river, between the two railway bridges, was also repaired, 3 new courses being built and stone filling added. The sides of the slide, where worn

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were covered with 3 inch plank of hardwood. New stop logs were provided for slide; the corners of piers patched; chains of booms adjusted and new clevises provided.

*Calabogie Lake*.—The chains of the booms here were examined and new ones substituted for those found unserviceable.

*High Falls*.—A coffer dam was built at entrance to slide and the piers of bulkhead, where gouged out, were repaired by inserting sheeting of 4 inch maple plank. A new pier 20 ft. square x 29 ft. high was constructed to support guide boom and another pier 16' x 20' at upper end of boom was built from low water mark.

*Ragged Chute*.—The top timbers of long pier at head of Chute were repaired and the sheeting on the two flat dams was patched.

*Duck's Rapids*.—The flat dams on both sides of river at this station were faced anew where the coverings had given out.

*Chain Rapids*.—The damaged portions of bulkhead piers were hewn and the surfaces afterwards covered with 4 inch maple plank. A guard iron plate 7' x 12' x 6 ft. was placed at stop log checks and was secured with 5/8" split spikes. In order to execute these repairs, it was necessary to shut off the water at head of slide by means of a coffer dam.

*Coulouge River*.—At a point about 500 feet above outlet of slide a support pier 90' long x 8' x 15 ft high was built to prevent slide structure from shifting towards chute. Four one inch iron tie rods secured to bolts, set in solid rock, were put in position to steady the slide at this point. Accumulations of logs and debris were removed from space between slide and shore to avoid damage by surging water. The booms at head of slide were re-covered with three inch plank and broken timbers replaced. The sheeting throughout the whole slide (nearly 3,000 feet in length) was renewed at many places in both bottom and sides. Four inch maple was used for bottom, and the same material, three inches thick, for sides. New foot boards of two inch pine were substituted where the old ones had become decayed. When the sheeting of slide was underway, rotten posts, braces and sills were replaced by sound materials at the same time as the plank-work progressed. A glance pier 80 feet by 9 feet by 10 feet high was built on shore to protect the bank opposite main governing dam. A pier, supporting guide boom, was rebuilt from low water mark up. The station house was also repaired, a new floor having been laid and a portion of the interior sheeted. Some minor repairs were effected at retaining boom opposite Fort Coulouge; broken sticks and chains having been renewed.

*Black River*.—At feeding gap, about 1 mile above slide, three piers were repaired; one was raised two courses, another three courses, and the third was rebuilt from low water mark. The sheeting in slide was patched from time to time and at the foot the sides of piers were sheeted with maple plank. A supply of four inch and six inch thick maple was provided for repairs during running season. On the 5th day of May, about 60 ft. in length of the outlet of the single stick slide was carried away by the spring floods. Temporary arrangements were made for the passage of the later "drives," by jacking up the bottom of the slide at the break.

*Petawawa River*.—At first and second chutes, some minor repairs were effected to the sheeting, posts and braces of the slides, and to the booms and attachments.

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At *Third Chute*, the sheeting in slide was repaired throughout its whole length. The sides strengthened by additional bracing and false posts; and leaks were stopped. At the entrance to slide the bulkhead pier, on west side, was rebuilt 35' x 10' x 4 courses high, and the guide booms at entrance to slide were repaired and new pickets provided.

At *Bois-dur*, some small repairs were made to the boom fastenings and to sheeting on face of flat dam.

At *Half Mile Rapids*, the dam across northern channel was repaired; the rear timbers were renewed for a distance of about 80 feet and the face of dam was also repaired and new fingers put in. An addition was made to the dam at main shore end where a washout occurred; this consisted of a pier dam 55 feet in length by 5 feet high.

*Crooked Chute*.—The old single stick retaining boom was doubled, new chains furnished, a snubbing post placed in pier on north shore, 6 new stop logs and a regulating roller were provided, the sheeting, posts, and braces of slide were repaired and near the outlet hardwood fenders were spiked to pier to guard against wear from passing timber and logs.

At *McDonald's Slide*, new boom chains were provided; flat iron laid in slide to protect the bottom, and the sheeting, posts, etc., patched where worn and decayed.

*Cedar Lake*. Immediately below the retaining dam, a glance pier 176' x 10 wide x 5' high was rebuilt on the north side of river, near foot of rapids. The bulkhead frame was renewed. The old structure was supported by posts, these were cut off and the new platform carried on small piers resting on the bulkhead piers; the top was covered with 6 inch pine plank and apparatus for regulating stoplogs was remounted. Six new stop logs were provided, two snubbing posts planted in the bulkhead piers and a single stick guide boom 354 ft. in length was doubled. The sides and corners of the piers were patched with 7 inch sheeting and along the front of the dam a sufficient quantity of stone and brush was laid to stanch the leakages.

*Dumoine River*.—Repairs were made to the long slide. The sheeting, on both sides and bottom of slide, was repaired at different places throughout the length of the structure. At the curves spruce timber was used to protect sides from abrasion, while at the steep pitch, near the foot, a quantity of new flooring had to be laid—and to better protect the surface thereof flat bars of iron were imposed and well secured with split or self rivetting spikes.

## EXTRAORDINARY REPAIRS.

*North and South Chaudiere Stations*.—Repairing slides, building storehouses, sheds etc., removing debris from slide channels and building temporary bridges and sidewalks for the accommodation of the traffic between Ottawa and Hull.

The "drives" of 1899 generally reached their destinations in due time, and during last spring and early summer months the waters of the Ottawa and tributaries were at a fair pitch for running timber and logs and were so maintained by timely rainfalls in the upper reaches, so that the operations of the raftsmen for the current season of 1900 promise to be successful.

The fire-swept district included the works, bridges and storehouses belonging to the Government at Hull and the Chaudiere section of Ottawa. The bridges (with the exception of the Union Bridge) had their superstructures totally

destroyed, and the piers and abutments of some of them, more or less damaged; the general store-houses and their contents were lost and the bulkheads, side piers, booms and other appliances of the slides, shared, to a certain extent, in the wreck.

No time was lost in restoring temporary lines of communication between Ottawa and Hull, and in order to accomplish this, with as little inconvenience to the public as possible, gangs of men were employed, day and night, for a considerable time after the fire.

The following statement, prepared from information furnished by the Collector of Revenue in your Department, shows the number of pieces of the various descriptions of timber that passed these works and the revenue accrued thereon, during the fiscal year ended 30th June, 1900:—

	Pieces.
Square timber.....	9,809
Saw-logs.....	3,086,879
Boom and Dimension Timber.....	36,244
Round and Flat Timber.....	6,539
Cedars.....	38,471
Railroad Ties.....	401,278
Fence Posts.....	139,772
	<hr/>
	3,718,992

Also 13,863 43/128 cords of pulp wood.

The revenue accrued on the above was \$40,256.88.

In respectfully submitting the above,

I have the honour to be, sir,

Your obedient servant.

GEO. P. BROPHY.

*Superintending Engineer Ottawa River Works.*

## REPORT ON THE ST. MAURICE RIVER WORKS.

[By F. X. THOS. BERLINGUET, SUPERINTENDING ENGINEER.]

PUBLIC WORKS OF CANADA,  
Resident Engineer's Office,  
Three Rivers, December 15, 1900.EUGÈNE D. LAFLEUR, Esq.  
Acting Chief Engineer,  
Department of Public Works,  
Ottawa.

THREE RIVERS, P.Q., December 15 1900.

Sir.—As requested in your letter No. 2383, I have the honour to submit the following report on the St. Maurice works for the fiscal year 1899-1900 ended June 30th last.

The St. Maurice, as is well known, is a river of great magnitude, it is one of the largest tributaries of the St. Lawrence, not only on account of its length, but also on account of the volume of its water. The three branches which form its outlet unite about a mile above the St. Lawrence, and from thence the river has an average width of a quarter of a mile, as far as Weymontachingue, that is to say, for more than 300 miles above its mouth.

Its course is generally through a very mountainous country, and is impeded by a great number of rapids and falls; the most important being the falls of Shawinigan, La Tuque and Grand'Mère; nevertheless there are considerable stretches which are navigable, and such is the rapidity of its current, and the roughness of its numerous falls and rapids, that no works, except those of the most solid, and permanent description, can be made to stand.

In fact, at certain seasons of the year, the river is considered unmanageable. The St. Maurice differs in this respect from the Ottawa and most other rivers where timber is made; here but few places are to be found where timber can be retained or boomed.

The St. Maurice works were commenced in December, 1851, at Three Rivers, Shawinigan and Grand'Mère, and additions thereto, to a limited extent, have been made nearly every year since.

The principal Government works extend up the River for a distance of about one hundred and thirty miles from the outlet.

Since 1892, the work has been divided into four sections, namely:—

GRANDES PILES.  
GRAND'MÈRE.  
SHAWINIGAN.  
THREE RIVERS.

*Grandes Piles.*—Section, extends from the fall bearing the same name as far as Mékinac from the 36th mile, to the 49th mile, a distance of 13 miles.

*Grand Mère.*—Section, extends from the 26th mile to the 36th., that is to say, from the Hêtres to the Grandes Piles' Fall a distance of 10 miles.

*Shawinigan.*—Section, extends from the 14th mile to the 26th., a distance of 12 miles, from the Gabelle Cascades to the Hêtres Falls.

*Three Rivers.*—Section, is 14 miles long and extends from the outlet of the River St. Maurice to the Gabelle Cascades.

When the water was at its lowest pitch and when the great bulk of the logs had passed, the foundations of the various structures were examined and repairs commenced. The work done under this head may be described as follows:—

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## REPAIRS AT STATIONS ON THE ST. MAURICE RIVER WORKS.

*Grandes Piles Section* :—The works were commenced in 1883, and additions thereto, to a limited extent, have been made nearly every year since. Some 6722 lineal feet of one to six ply booms are now in use.

Eighth piers (Nos. 7, 8, 11, 12, 13, 14, 15 and 16) supporting retaining booms were repaired. New timbers which had been carried away were replaced on tops of piers, stone filling added.

Two new piers were built at Pte. à Magdeleine to increase the capacity of the booms on the western side of the river.

Three new piers were built at Pte. à la Mine for a guide boom, also 440 lineal feet of five ply boom. The Boom master's house was shingled, and repaired. A number of boom chains were supplied. Stone ballast was put in the piers where necessary.

The total amount expended during the year is, as follows :—

Construction .....	\$6,548.54
Staff and maintenance .....	5,721.00
	<hr/>
	\$12,269.54

*Grand'Mère Section* :—The works were commenced in 1852. Some 7569 lineal feet of one to five ply booms are now in use.

The dam built in 1878, at the head of the Grand'Mère Falls, to close the channel, where the old slide stood, so as to prevent the logs from accumulating in great quantities during the time of high water. Slight repairs were made to piers Nos. 1, 2, 3 and 4 at Pte. Trahan. Seven mooring piers 30' x 25' were built at the island above the "Petites Piles," to retain logs on the western side of the river, also 850 lineal feet of three and five ply booms were built, and a number of boom chains were supplied.

The total amount expended during the year is, as follows :—

Construction .....	\$12,512.15
Staff and maintenance .....	4,471.10
	<hr/>
	\$16,983.25

*Shawingigan section* :—The works were commenced in 1851, and additions thereto, to a limited extent, have been made these last few years. Some 22,190 lineal feet of one to six ply booms are now in use.

1890-1900.

The bottom and sides of the slide were repaired by replacing the worn-out timber and planking with new material, the apron faced with hardwood, and the projecting spikes in the bottom and sides of the slide were countersunk. Renewing dam and bulk-head of the slide and pier at foot of slide. Piers Nos. 40, 69, 74, 73, 75, 76, 79, 81, 82, 85, 87, 88, 89, 90, were partially taken down and the damaged timbers removed and replaced by new. Plank fenders were spiked on the exposed sides of the piers : some new snubbing posts put up, and the stone filling brought up to level. Two mooring piers (Nos. 91 and 92) 25' x 30' were built at Pointe à Bernard to increase the storage of logs, also 760 lineal feet of five ply and 600 of three ply booms were built. Rebuilding the wharf down the slide. Chains, clevises, boom fastenings were overhauled and renewed. Repairs were done to the boom master's house, a number of boom chains were supplied.

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The total amount expended during the year is as follows :—

Construction.....	\$ 3,604 35
Staff and maintenance.....	9,727 22
	<hr/>
	\$ 13,531 57

*Three Rivers Section*.—The works were commenced in 1851, and additions thereto, to a limited extent, have been made these last few years, some 37,674 lineal feet of booms, two to eight ply are now in use.

1899-1900.

Two anchor piers 25 'x 30' were built above the highway bridge for the guide boom leading to the lower one at L'île St. Quentin. The removal of a number of boulders from the channel at the sluicing gap, below the railway bridge, the object in view being, to provide the passage of timber and logs at low water season without jamming. Fourty-seven mooring piers (Nos. 11, 12, 16, 17, 19, 21, 23, 25, 26, 39, 40, 47, 49, 51, 53, 54, 56, 57, 62, 63, 64, 66, 71, 69, 72, 74, 75, 76, 93, 95, 96, 83, 85, 86, 92, 94, 97, 98, 99, 100, 103, 104, 106, 107, 108, 110, were repaired, some had to be rebuilt from the water's edge, and others were partially taken down and had the damaged timbers removed and replaced by new ones, mooring posts were placed where necessary. Additional chains were provided to increase the capacity of the booms above the railway bridge, 5,724, lineal feet of 4, 6, 7, and 8 ply booms were built.

The total amount expended during the year is as follows :—

Construction.....	\$ 7,073 24
Staff and maintenance.....	28,271 48
	<hr/>
	\$ 35,344 72

It will be readily seen from the following, the various points on the river where accommodation has been increased and to what extent.

		Capacity in		
		1892	1898	1900
		Logs.	Logs.	Logs.
<i>Three Rivers Section</i> :—				
Cap Corneilles.....	2 miles from outlet.....	100,000	200,000	200,000
Pointe à Lambert.....	4 " " " ".....		30,000	70,000
<i>Shawinigan Section</i> :—				
Iles aux Tourtes.....	17 " " " ".....		150,000	150,000
Bay Shawinigan.....	20 " " " ".....	60,000	60,000	60,000
River Shawinigan.....	20 " " " ".....		10,000	10,000
Iles de la Chute, above slide.....	22 " " " ".....		80,000	80,000
Pointe à Bernard.....	23 " " " ".....		50,000	100,000
Iles des Hêtres.....	24 " " " ".....		150,000	200,000
<i>Grand'Mere Section</i> :—				
Little Piles.....	34 " " " ".....		30,000	100,000
<i>Grandes Piles Section</i> :—				
Grandes Piles.....	37 " " " ".....	100,000	100,000	250,000
Pointe à Magdaleine.....	38 " " " ".....		100,000	200,000
		<hr/>	<hr/>	<hr/>
		200,000	960,000	1,420,000

The following statement, furnished by the collector of slide and boom dues, shows the quantity of the various descriptions of timber that passed the Government works, during the season 1899.

Statement of the number of saw-logs, &c., that passed through the Government slide and works on the St. Maurice river during the fiscal year ended June 30th, 1900.

	Pieces.
Saw-logs.....	664 045
Logs for pulp wood.....	483 136
Square timber.....	3 191
	<hr/>
	1,150 372

*Recapitulation* :—The total amount expended at 120 different sections of the St. Maurice River Works during the fiscal year ended June 30th, 1900, was of follows :

At Grandes Piles.....	\$ 12,269 54
" Grand'Mere.....	16,983 25
" Shawinigan.....	13,531 57
" Three Rivers.....	35,344 72
	<hr/>
Total.....	\$ 78,129 08

I have the honour to be, sir,

Your obedient servant,

F. H. THOS. BERLNIGUET,

*Superintendent Engineer.*

A complete review of these works was made in annual report of 1899, page 212, part 4.



## REPORT ON THE TRENT AND NEWCASTLE DISTRICT WORKS.

(By R. B. ROGERS, SUPERINTENDING ENGINEER.

The works on this district are constructed for two purposes, namely those constructed for the benefit of navigation and constructed for the benefit of the lumbermen. The former, such as locks and canals, are under control of the Department of Railways and canals, the latter, such as slides and booms together with the improvements of the river navigation is under the charge of the Department of Public Works.

The works are situated along the river Trent and its upper waters between the Bay of Quinte on the south and Balsam lake on the north, a distance of about 170 miles.

There is a very large water-shed reaching as far north as the head waters of the Madawaska on the north and west comprising an area of over 2,000 square miles. The regulation of this large water-shed has become a very important matter to navigation, to the descent of timber and the many industries located along the route.

The water throughout the season was about normal, though the spring freshet was about the average height and passed off without doing more than the usual amount of damage to the works.

The works are now in fair condition. Most of the larger works that are required for the running of logs are built so that in future, unless other large works are erected for the lumbermen, the expenditure for maintenance and renewals will be smaller than for some years past.

The following works were executed at the different stations during the year :

## OTONABEE RIVER.

The work of dredging the shoals at "Yankee Bounet" was proceeded with. For this purpose the use of the dredge "Trent" was loaned from the Department of Railways and Canals. A fairly good channel was made, but there is considerable work yet required to be done to make it a safe channel of navigation.

## LINDSAY RIVER.

A special grant was made to deepen the river at the town of Lindsay, between the old railroad bridge and the Wellington Street bridge. The greater part of the material was rock, but this was overlaid in many places with gravel which rendered the drilling very troublesome. The whole length of the channel dredged was 1,400 feet with a width of 80 feet; the depth of material dredged was between 2 and 5 feet. The channel had to be drilled and blasted for its entire length. About 6,000 cubic yards of material was removed. A considerable portion of the rock was carted away at the expense of the town for use on the streets.

64 VICTORIA, A. 1901

## KEENE

A new wharf 90 feet in length was constructed at the south side of the highway bridge in the village of Keene. The channel to the east of the wharf was also dredged. These improvements have been of great benefit to navigation and the travelling public.

## MOUNT JULIAN.

A special grant was made for the improvement of the approaches to the wharf at this place. The work was done and has given much easier access to the landing.

## FENELON FALLS.

The construction of the timber slide was proceeded with and completed. This work had to be stopped owing to the high water in the spring, in consequence of which it was not completed at the end of the last fiscal year. Good work has been done; though the current from the slide would have impeded navigation less had the land owners, on the south side, not insisted on the slide being built in the old location. Piers and booms were also built below the slide: in order to preserve a channel through the sawlogs when running.

## BUCKHORN.

The south piers of the slide had become weakened by the under-mining action of the water and the decay of the timber of which it was composed, that it became necessary to strengthen it; this was done by constructing a new pier on the down-stream side of the old pier. The floor of the slide was also renewed with six inch elm. New stoplogs were placed where required.

## KATCHAWANNOE LAKE.

The boom extending from Young's Point to Lakefield, a distance of about 5 miles, was overhauled and repaired. New anchors were put in where required.

Minor repairs were executed when required at the different stations along the line.

## SURVEYS.

A survey was made and the soundings taken and the plans prepared for the work of removing rock and boulders at Black River and McDonald's Rapids on the Severn River.

I have the honour to be, sir,

Your obedient servant,

RICH'D. B. ROGERS,

*Superintending Engineer.*

## BRIDGES.

It may be stated that in the older provinces of the Dominion, the Federal Government has confined itself, as a rule, to take under its exclusive control and make provision towards the construction and maintenance of important interprovincial road bridges and bridges repaired across waterways.

In the sparsely settled districts of the North-west Territories, the Government of Canada has undertaken to provide for the erection and maintenance of ordinary road bridges over large streams; bridges that are urgently needed to afford uninterrupted communication through trails and highways of national importance, which neither the municipalities, to be more immediately benefited by the structures, nor the territorial authorities most directly concerned could be expected to erect and maintain at their sole expense.

During the last fiscal year works have been executed on the following bridges:

## OTTAWA.

*Bridges over slide and hydraulic channels.*—The sidewalks on both sides were covered with 2 inch pine plank and the roadway scraped and patched when found necessary. During the winter months ice, snow, etc., were removed from sidewalk and roadway. After the fire temporary sidewalks were built to accommodate foot passengers.

*Union Bridge.*—A broken diagonal tie rod underneath the roadway was taken out and repaired; other rods and braces were adjusted; the sidewalk on east side was covered with 2-inch plank and the roadway kept clean. Ice and snow were removed from sidewalks and roadway. A portion of the flooring, 13 feet in width was renewed on east side the whole length of bridge; oak, 3 inches in thickness, was used for the bottom course and 3-inch pine for top covering. The sidewalks were also patched where damaged by fire on both sides of bridge.

*Hull Bridge.*—The westerly portion, 8 feet in width, 90 feet long was covered with 3-inch red pine plank. The roadway and sidewalk were kept clear of ice and snow.

*Roadway between Ottawa and Hull.*—The masonry of the causeway and bottom of arch at north end of Union Bridge were pointed with cement mortar. A small pier of stone was built at the north-west corner of abutment of Union Bridge to prevent stonework from crumbling away by action of surging water. The pavement was cleaned from time to time and the debris carted off. The sidewalks along causeway were temporarily repaired where damaged by fire; railings, guards, fences, etc., were erected to protect foot passengers and vehicles.

*Sappers Bridge.*—The space on the north side of the Sappers Bridge—the site of the old sidewalk—was laid with scoria block paving. The old road-bed was removed; a concrete foundation made, the blocks laid and then grouted. The space covered was 270 feet long, 8 feet wide, and its completion gave the whole roadway surface of the bridge, a permanent pavement.

*Extraordinary repairs, in consequence of fire of 26th April last, Chaudière bridges over slides and hydraulic channels.*—Removing damaged ironwork of bridge superstructure and carting it away. Clearing slide and hydraulic channels.

## NORTH WEST TERRITORIES.

## BATTLE RIVER BRIDGE, N.W.T.

The Battle River Bridge across the Battle river at Battleford was constructed in 1890 and collapsed in 1900.

It consisted of three spans. Two spans of 70 feet each and one span of 150 feet, with trestle approach at the north end.

The timber was of spruce and was rafted down the Saskatchewan river two years before the construction of the bridge began, that would be 1888.

In putting in masonry piers and iron superstructure there were not any quarries at or near Battleford and that the nearest place for suitable stone is Winnipeg, so that masonry would be out of the question.

There is an abundance of material for concrete, but the cost of the cement would be excessive.

Before examination of the piers and abutment, now in place, they are in very good condition, some repairs are necessary owing to damage by ice last spring, but they are sound and good for a number of years. It would be a pity to sacrifice these piers, as iron superstructure could be put on and concrete piers substituted at some future day.

The foundation upon which the piers are built is of capped piles. There is not the slightest sign of settlement.

In connection with highway bridges in this ranching country careful consideration must be exercised. The test being a band of wild cattle or horses stampeding across a bridge or becoming tangled up in the centre of a bridge and undecided which way to go. It is not customary to put horses or cattle over a bridge when the streams are fordable, but the streams are not always fordable and the bridges should be built to fully meet the conditions previously mentioned.

The Battleford bridge could be re-constructed upon the original plan. The timber to be brought here (Edmonton) from B. C. and framed during the fall, winter or spring, then rafted to Battleford in June next during high water or follow the ice in April.

The timbers of the old bridge would answer for false work and all the iron would be on the spot. The cost of reconstruction would be thirty thousand dollars.

The unprecedented flood of last year altered the main channel of the river in many places: shifted sand bars; made many new bars and zigzagged the channel on many long stretches from one side of the river to the other, making it very difficult to follow. The sand bars are a much worse feature to contend with than the rapids at a fair stage of water.

There are twenty-four rapids between Edmonton and Battleford (the distance is 400 miles at least). The "crooked" rapids is difficult for rafting except at a high stage of water.

No rafting is attempted later than September 15th.

## BELL RIVER BRIDGE, (LETHBRIDGE.)

Lethbridge is situated at the Alberta Ry & Coal Co's mines commonly known as the Galt coal mines 109 miles from the main line of the Canadian Pacific Rail-

## SESSIONAL PAPER No. 19

way and 50 miles from the International boundary line. It is on the Crows Nest Pass Railway and a line runs out of Lethbridge to Great Falls.

The bridge across the Belly river is about two miles from the town and consists of four spans of 150 feet each, in the clear, besides trestle approach at north end.

In June last an inspection was made with the intention of tightening up the bridge &c., but found that the Inspector of works for the North West Government in that district had instructions to proceed with work and in addition to tightening the bridge up to proper cambre some work had been done to the piers where they had been damaged by the ice. This work was not at all satisfactory and should not have been proceeded with at that season of the year; the water being on the rise and no other craft to work from than a small raft, which owing to the rapid current, was always half under water. This did not conduce to economical work nor good workmanship.

During high water the debris would not in any way injure the pier and any repairs after the ice damage should be done during the winter, weather would be no hindrance as the winters there are not at all severe.

The repairs to the piers were not completed.

There is some boiler plate to be put on, not only to replace what the ice carried away, but a strip is needed from the point of the nose of piers back to the angle with the body of the piers.

The north approach is improved by throwing the railing of the approach, where it closed upon the road at a greater angle and filled in with earth. This improvement gives ample room for the string teams to make the turn with ease; formerly they were obliged to run the leaders up the hill-side.

The appropriation authorized for tightening up the bridge and improving the north approach was \$200.00. \$500.00 was expected to be granted. In that event there should be a balance of \$327.04 for the boiler plate necessary and completion of the wood work; that is if the whole appropriation amounts to \$700.00 but if the whole sum available \$500.00 then there is a balance of \$127.04. This sum will not be sufficient as \$300.00 will be necessary to put the bridge in proper repair as regards substructure.

The superstructure is in excellent condition in every respect, excepting four planks in the flooring. These can be replaced when the other work is being carried out.

## BELLY RIVER BRIDGE, (STANDOFF.)

Standoff is fifteen miles from Macleod due south. It consists of a small store and stopping place combined and some ranch buildings. The bridge crosses the river about half a mile from the stopping place (south).

The bridge was erected by the North West Government and consists in trestle approach on north side and 90 foot steel truss.

In connection with mountain streams it is most essential to guard against the ice flow in the first place; the debris during flood period and further an occasional rise in August. The unprecedented flood of last year was in August.

The Belly river at Standoff is a small stream as compared with the same stream at Lethbridge, it being augmented by the Old Man's nose between Macleod and Lethbridge, where (Lethbridge) the Dominion Government placed a bridge and which has to undergo repairs through damage by ice when the piers are protected by heavy sheathing and boiler plate. It simply follows that 2" plank is not any protection on piers placed in a mountain stream. The damage from debris can only be obviated by not allowing it to accumulate.

The steel superstructure (90 feet) is very high for a highway bridge in a ranching county. It may be subjected at any time to the excessive strain of a

band of wild cattle or horses stampeding over it, or which is worse if possible, a band of cattle on the bridge and undecided as to which way they intend to go. However, it is not customary to put cattle nor horses over a bridge when the stream is fordable, but the streams are not always fordable and then the bridge is supposed to be equal to the emergency.

The steel superstructure has not been put together with sufficient care or proper workmanship as many of the rivets are so loose as to be useless.

The bridge is not located on the road allowance on the north side, as a crossing on this line could not justifiably be made, so the road to the bridge runs through private property and is not fenced in.

This matter of the road approach should be arranged with the owner to avoid damages.

#### EDMONTON BRIDGE.

Edmonton is on the north side of the North Saskatchewan River, in the District of Alberta, N.W.T., situated on the high table land above the deep valley of the Saskatchewan, about 192 miles north of Calgary.

On either side of the river the higher plateau is at an elevation of about 190 feet above the river level, and the slope toward the lower plateau or narrow valley is very sharp.

On the south side of the river, opposite the town of Edmonton, is 'South Edmonton,' the terminus of the Calgary and Edmonton Railway (operated by the Canadian Pacific Railway Company), from which all freight for Edmonton and the northern districts has to be taken across the river on scows or ferries and during the seasons of running ice and high water at a great disadvantage and sometimes not without danger to life and property.

In 1892 a survey was made by the Dominion Government to select a site for a traffic bridge across the Saskatchewan at Edmonton. The location of the bridge was fixed nearly opposite the centre of the town where roads leading to the foot of the hills existed or could easily be built. It was intended to build only a highway traffic bridge, and the location was made with this end in view; subsequently, the town of Edmonton, offered a contribution of \$25,000 towards its construction on condition that the Government would build a combined railway and traffic bridge. This was accepted and plans ordered.

Tenders were called for the substructure or masonry work in July, 1897, and the contract awarded to Francois Lemoine, of Montreal, August 17, 1897, for the bulk sum of \$36,500, not including piles in foundation, which were to be paid, as per schedule price, \$1 per lineal foot in the work.

The work under contract comprised the building of three piers and two abutments, piling in foundations, rip-rapping, and road approaches on both sides.

Work commenced early in September, 1897, but was stopped November 9, for the winter. It was resumed March 27, 1898, and completed June 20.

The piers and abutments, which are made entirely of concrete, are 173 feet 8 inches distant, centre to centre. They are of rectangular section, and at the top carry a cap of cut stone for the bridge girder plates. At the base up stream and down stream ends are rounded and the ice cutter brought up with a slope of 1 to 1.

The smallest section at the top is 7 x 24 feet, and the largest section at the base 9.3 feet by 35.3 feet. The caissons have a width of 14.5 feet, and an extreme length of 52.5 feet, the foundation area being 656 square feet. The average total height of the piers above foundation bed is 38 feet, and above low water level 30 feet.

The piers are founded below the alluvial gravel deposit made by the river on indurated clay, permanent in character, and is the same material which forms the

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foundation of the bluffs adjoining the river. This material is called by the miners, hard-pan or country rock. It varies very much in hardness, some spots being found relatively soft, others as hard as shale; excepting the hardest variety, it crumbles to pieces when exposed to the air.

*North Pier.*—Five feet in depth of drift gravel was removed at the north pier, or a total of about 250 cubic yards. At that depth 7 feet below extreme low water level a hard stratum of clay shale was reached. After testing, it proved to be only a thin crust, about 8 inches in thickness, underlaid by ordinary clay.

Piles were ordered for the foundations. The caisson was first sunk into place and piles driven inside to a very hard stratum. They were then cut off 5 feet below low water level and the caisson filled in solid, with Portland cement concrete, from the hard-pan bottom.

*Centre pier.*—About 250 cubic feet of drift gravel was removed from the foundation pit, to a depth of  $7\frac{1}{2}$  feet of water, the depth of gravel averaging 5 feet.

This gravel was underlaid by a hard stratum of indurated clay, or clay shale. Borings at different places inside the foundation area did not show any soft stratum or soft pocket and this material after testing was proved to be perfectly safe for the foundation of the pier.

*South pier.*—The depth of the drift gravel averaged only 6 inches and the quantity of material removed about 25 cubic yards.

The stratification there was about the same as at the north pier, though generally harder. Piles were ordered and driven in the same way as described for the north pier; 67 piles were driven in each of these piers.

*Caissons.*—Caissons for the three piers were made of 12 in. x 12 in. British Columbia fir timber. All joints were caulked and when sunk into place, clay was deposited outside and rammed round the base of the caissons. Concrete filling was then started, and the concrete deposited under water to a depth of about 3 feet with a specially constructed box.

After allowing three days for the setting of this layer, the caissons were pumped out and the concrete continued up to low water level, in the dry, well rammed and packed under the cross ties, and over the top of piles.

The body of the pier proper was started at low water level and carried up in a timber casing. Tongued and grooved boards were used to mould the straight faces, and thin sheet iron supported by scantlings for the end curves.

*Abutments.*—About 450 cubic yards of earth excavation removed from the foundation pits, and 45 piles for each abutment driven to firm stratum.

These were cut off 6 inches above formation level and a strong grillage laid on top. The concrete was well rammed around the head of the piles and between the pieces composing the grillage. No timber was left exposed.

*Concrete.* Proportions and ingredients for the concrete were measured by volume, a barrel of cement being taken as unity.

The proportions were as follows:

1 Portland cement;  $1\frac{3}{4}$  to 2 of sand; 5 of broken stone (size  $2\frac{1}{2}$  in.)

A special finer concrete used for the facings was as follows:

1 Portland cement;  $1\frac{1}{2}$  sand; 4 broken stone (size  $1\frac{1}{2}$  in.)

The facing and backing were carried at the same time in the same layers.

Before placing the concrete for facing, cement mortar of 1 cement to 1 sand was spread over the previously deposited layer, close to the boards forming the casing. The concrete was then deposited, worked with the shovel and rammed,

forcing the cement mortar along the face of the mould and filling in all voids. In this way the facing was very successful, showing after the removal of the timber casing, a smooth dense surface without pits or irregularities.

Before beginning a new layer the concrete already set was well scraped, swept and thorough wetted.

During hot weather the fresh concrete was always protected from the direct rays of the sun by wet canvas sheets and sprinkled from time to time.

*Cement and Cement Testing.*—The work was entirely done with Portland cement. One thousand barrels of the 'Josson' brand or Belgian cement, and 1,200 barrels of the 'Samson' brand, or Owen Sound cement, were used in the work. Out of this number 12 barrels were rejected.

The tensile strength for most of the briquettes made, after nine day's immersion in water, was over 500 pounds to the square inch, the briquettes having been previously allowed to set for 18 hours before immersion.

Quite a number of tests gave a strength of over 650 pounds to the square inch at that age.

These tests were highly satisfactory when it is considered that they were made without all the care taken in laboratories, and without any extra ramming for compactness, and when frost at night was quite frequent.

Tests of briquettes, 1 cement to 2 sand, were also satisfactory, both as to their tensile and crushing strength.

*Rip-rapping.*—About 300 cubic yards of rip-rap stone was deposited around the caissons.

The work in progress on 9th October, 1899 was raising the abutments and pier in concrete 8 feet. The unprecedented flood of August 1899, which covered the piers to a depth of 6 feet made it imperative that the work of raising the piers be executed.

One abutment (south) was completed and the other well underway. During the work upon two of the piers the weather was unpropitious and there were a few degrees of frost, but with large mattresses to cover the work, etc., at night, no injury occurred.

During the prosecution of this work the false work was being put up for the first two spans.

After the concrete work was finished and the false work, laying the bed plates was in order; after which the Bridge Co's engineer begun measuring out the iron.

The work went smoothly all through the winter, but one week all told, when fall work did not go on.

The bridge was opened for traffic April 4th last, but was not accepted until April, 7th.

The painting of the bridge was completed June 25th last.

The structure is first class in every respect.

Two trestle bents were put in at the north end of the bridge in connection with the approach, and the approach finished with earth; top dressed with broken stone purchased from the Bridge Company, and a layer of coal slack put on. The approach is very satisfactory.

The south approach, without the coal slack, is treated the same way.

#### GRAND RIVER BRIDGE.

This bridge is situated at York, Haldimand County, and was erected by the Government in 1890-91. The superstructure is composed of four spans of iron; the two ends one being 106 feet 4 inches in length and the two inner ones, 106 feet 2 inches each, total length of iron superstructure 425 feet resting upon three



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stone piers and two abutments built of second class masonry. There are two approaches, the one on the east side 50 feet long.

The superstructure cost \$8,800.00, and the masonry \$8,153.58. The approaches cost \$6,465.00.

In 1893-4 5 and 6, repairs were made to the embankments of the approaches, costing \$390.00.

During the past fiscal year the whole of the iron work was repainted, the flooring renewed and the rip-rap walls around the abutments repaired at an expenditure of \$773.00.

Total expenditure upon this structure to date \$24,191.28

## CEMENT.

CEMENT LABORATORY, Dept. of Public Works, November 13th 1900.

E. D. LAFLEUR ESQ., C. E.

Acting Chief Engineer,

Dept. of Public Works.

Sir:--I have the honour to enclose herewith, the annual report of this branch of the Department, for the year ended the 30th of June 1900.

I am, Sir,

Your obedient servant,

GEO. E. PERLEY

Engineer in Charge.

Since June 30th 1899 all samples submitted to this branch have been tested as fully as possible and reported upon to you.

The Portland cements have shown a marked improvement in all respects, they are finer ground and show a higher tensile and crushing strain, their setting is more uniform.

The above is no doubt attributable to the thorough test all cements are subjected to by the Government testing Laboratory; the importers have awakened to the fact that the largest use of the commodity has laid down very stringent rules to be followed in the testing of cements and have apprized the manufacturers to that effect, thus insuring an article superior to that imported a few years ago.

In speaking of Portland cement it is not implied that all cements labelled "Portland," are the real article; there are cements made in Belgium and so labelled, but they are only natural cements having nearly the same chemical constituents as a straight Portland, these cements are cheaper and when used in work show good results up to six months and then deteriorate, causing no end of trouble and expense, whereas a straight Portland or a silica Portland will cost more in first outlay but will be found less expensive ultimately, there being little or no deterioration.

During the year the cement supplied for the construction of Maria Street Bridge, Ottawa, in the first instance was condemned as it did not comply with the requirements of the specification which called for 350 pounds per square inch tensile strain at 7 days, out of 7 samples the variation was from 287 pounds to 343 pounds. This was "Citadel," brand, a silica Portland, fifty per cent of sand being ground with fifty per cent of a good Portland cement. A change was made for a straight Portland cement, "Star" brand of Napawee Mills, which gave the following tests, out of 9 samples the variation was from 430 pounds to 614 pounds.

"Star" brand was authorized to be used at Portage du Fort bridge, when the samples were sent to the laboratory they had not the appearance of Napawee "Star," an investigation by the engineer in charge of the laboratory was made which proved the cement to be "White Star," a Belgian natural, and from fifty cents to a dollar cheaper per barrel than the brand specified, tests were made of the samples submitted of "White Star" showing a tensile strain at 7 days of 277 pounds, the standard as set by the department being 380 pounds at 7 days.

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This cement was condemned and "Hercules" brand, a GERMAN CEMENT was substituted, tests of which gave results ranging from 430 to 472 at 7 days. "Star" brand Napanee was then used, the tests of which for 7 days, ranged from 577 to 674 pounds.

"Citadel" brand was authorized for use at the extension of the dry dock at St. Joseph de Levis, the first samples were unsatisfactory and the consignment was refused, a further delivery was received and up to date filled all requirements.

This branch has been called upon by the Departments of Railways and Canals, Marine and Fisheries, Militia and Defence also the Inland Revenue.

In the case of the Department of Railways and Canals, the Minister, Mr. Blair asked Mr. Tarte's permission in 1898 to have the Engineer in charge of the cement laboratory go over the Soulanges Canal and select samples of Thorold cement and make tests thereof, this request was granted, the samples were selected and tested in the laboratory, a thorough report was submitted to Mr. Blair of these tests.

From time to time information in regard to the different brands of cement has been supplied to Mr. Schreiber and Mr. Potinger also to Mr. Phillips for the Rideau Canal; Mr. Rogers of the Trent Canal, for the latter a number of check tests have been made principally of "Star" brand Portland.

The work done for the Inland Revenue was on a sample of "Sky" that was used in the room occupied by the condenser in the basement of the west block.

It will be seen by the foregoing the necessity of keeping this branch up to date by placing an amount in the estimates to fully equip the branch with the necessary requirements also to ensure a better grade of cement by having samples submitted, by the importers on the opening of navigation, and a series of samples sent or collected from the various manufacturers of Canada by a competent man.

The Departments would have the benefit of these tests from all sources and it might be so arranged that engineers and contractors would be able to familiarize themselves with the best brands of cement on the market.

It is necessary that tests be made every year, as the cement shipped to this country, say in the spring of 1901, will be the grind of the season of 1900, as there is a great difference in each seasons grind.

In the Canadian manufacture a constant series of tests would be necessary as the cement is available the year round.

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An effort is made in this report to review all the income producing works such as wharfs, piers &c., which are immediately or indirectly under the control of this Department.

Beach protection works, opening of channels &c., are not included, excepting in the few cases in which the work was done during the fiscal year.

This review gives the total expenditure to 30 June and date of transfer of works to the control of other Departments.

In conclusion I take great pleasure in complimenting the officers under my control for the great zeal shown in managing the different works under their charge.

E. D. LAFLEUR

*Acting Chief Engineer, Public Works of Canada.*



PART V

Report on Government Telegraph Lines

FOR THE

FISCAL YEAR ENDED JUNE 30, 1900.



## GOVERNMENT TELEGRAPH SERVICE.

OFFICE OF THE GENERAL SUPERINTENDENT.

OTTAWA, 14th December, 1900.

SIR,—I beg leave to submit herewith my report on the Government Telegraph Service for the twelve months ended 30th June 1900.

This report, similarly to that of the previous year, is prefaced by a list, to date, of the land lines and cables in operation; with data of lengths, year of construction, number of offices at present established and an estimate of the traffic obtaining.

The usual tabular statements giving lists of the offices, operating staff, &c., in the several districts are appended to the report, likewise the tariff sheets giving the rates charged for messages on the several lines.

A supplementary report conveying a resume of what has been presented in the annual reports connected with this branch of the department since 1882 when a historical sketch was submitted, is now in course of preparation.

I have the honour to be, Sir,

Your obedient, servant,

D. H. KEELEY,

*General Superintendent.*

J. R. ROY, Esq.,

Acting Secretary, Department Public Works.

## GOVERNMENT TELEGRAPH SERVICE.

Location of Lines.	Points connected.	Year.	Length of Lines.			Number of Offices.	Yearly Average of Messages Sent.
			Land Lines.	Cables.	*Total.		
			Miles.	K'ts.			
Newfoundland.	Port au Basque—Cape Ray . . . . .	1883	14	.....	14	2	.....
Nova Scotia . . . . .	North Sydney—Meat Cove (with loops) . . . . .	1880-98	147½	.....	148½	13	3,000
"	Across Bras d'Or Channel . . . . .	1880	.....	1	1		
"	" St. Ann's Harbour . . . . .	1887	.....	1	1		
"	" Ingonish Harbour . . . . .	1887	.....	1	1		
"	Meat Cove—St. Paul's Island . . . . .	1890	.....	20	20	2	50
"	On St. Paul's Island . . . . .	1890	3	.....	3		
"	Mabou—Cheticamp . . . . .	1887	63	.....	109	8	2,500
"	Cheticamp—Meat Cove . . . . .	1900	46	.....	46		
"	Barrington—Cape Sable . . . . .	1883	16	.....	16		
"	Across Bear Point Channel . . . . .	1883	1½	.....	17½	Leased	.....
"	" Lt. House Channel . . . . .	1883	.....	1	1		
New Brunswick.	Chatham—Escuminac . . . . .	1885	42	.....	42	5	600
"	<i>Bay of Fundy System :</i>						
"	Eastport—Campobello . . . . .	1880	.....	1½	1½		
"	On mainland Eastport . . . . .	1880	3	.....	3		
"	On Campobello Island . . . . .	1880	7½	.....	7½		
"	Campobello—Grand Manan . . . . .	1880	.....	7½	7½		
"	On Grand Manan Island . . . . .	1880	25½	.....	25½	44½	8 2,500
"	Grand Manan—Cheney's Island . . . . .	1890	.....	½	½		
"	On Cheney's Island . . . . .	1890	.....	¾	¾		
"	Cheney's Island—Whitehead Island . . . . .	1890	.....	¾	¾		
"	Partridge Island—Fort Dufferin . . . . .	1900	.....	¾	¾		
Quebec	Bay St. Paul—Chicoutimi . . . . .	1881	92	.....	92	6	.....
"	Branch St. Alexis to L'Anse St. Jean . . . . .	1898	40	.....	40	1	12,000
"	Murray Bay—Baie des Moutons . . . . .	81-1900	733½	.....	733½	42½	
"	Across Saguenay River . . . . .	1883	.....	1½	1½		
"	Bersimis to Manicouagan . . . . .	1883	.....	12	12		
"	Manicouagan to Godbout . . . . .	1883	.....	26	26		
"	<i>Quarantine System :</i>						
"	Quebec—L'Ange Gardien . . . . .	1885	13	.....	13		
"	L'Ange Gardien—Orleans Island . . . . .	1885	.....	¾	¾		
"	On Orleans Island . . . . .	1885	29½	.....	29½	52½	7 2,300
"	Orleans Island—Isle Réaux . . . . .	1889	.....	2	2		
"	On Isle Réaux . . . . .	1889	2½	.....	2½		
"	Isle Réaux—Grosse Isle . . . . .	1889	.....	2	2		
"	On Grosse Isle (all told) . . . . .	1885-94	34	.....	34		
"	<i>Anticosti System :</i>						
"	Gaspé—L'Anse à Fougère . . . . .	1881	28	.....	28		
"	L'Anse à Fougère—Anticosti . . . . .	1881	.....	44½	44½		
"	On Anticosti Island . . . . .	1881-90	223½	.....	223½	316½	10 1,500
"	Anticosti—Long Point, Mingan . . . . .	1890	.....	21	21		
	Carried forward . . . . .		1,530	143	1,673	104	24,450

\* For convenience in totalling, the knots of cable are regarded as statute miles.



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GOVERNMENT TELEGRAPH LINES—*Concluded*,

Location of Lines.	Points connected.	Year.	Length of Lines.			Number of Offices.	Yearly Average of Messages Sent.
			Land Lines	Cables	* Total		
			Miles	K'ts.			
	Brought forward .....		1,530	143	1,673	104	24,450
Quebec .....	Meat Cove (C.B.) — Magdalen Islands .....	1880		55			
" .....	On Magdalen Islands .....	1881	83	$\frac{1}{2}$	138 $\frac{1}{2}$	9	2,000
Ontario .....	<i>Pelee Island System :</i>						
" .....	Leamington—Point Pelee .....	1889	12				
" .....	Point Pelee—Pelee Island .....	1889		9 $\frac{1}{2}$			
" .....	On Pelee Island .....	1889-98			35	10	800
		1900		13 $\frac{1}{2}$			
North-west .....	Qu'Appelle—Edmonton and St. Albert .....	1883-87	607 $\frac{1}{2}$		607 $\frac{1}{2}$	15	4,700
" .....	Moosejaw—Wood Mountain .....	1885	90 $\frac{1}{2}$		90 $\frac{1}{2}$	2	300
British Columbia .....	Ashcroft—Barkerville .....	1878-87	276 $\frac{1}{2}$		276 $\frac{1}{2}$	8	4,500
" .....	Victoria—Cape Beale .....	1891	118				
" .....	Alberni—Cape Beale .....	1899	57		175	7	150
" .....	Nanaimo—Comox and Alberni .....	1893-95	110 $\frac{1}{2}$		110 $\frac{1}{2}$	8	7,000
" .....	Kamloops—Lower Nicola .....	1899	67		67	6	2,000
" .....	Ashcroft—Lillooet .....	1896	62		62	1	500
Yukon .....	Bennett—Dawson .....	1899	564				
" .....	Tagish—Atlin .....	1899	75		639	15	30,000
	Totals .....		3665 $\frac{1}{2}$	208	3874 $\frac{1}{2}$	185	76,400

\* For convenience in totalling, the knots of cable are regarded as statute miles.

## REPORT ON THE GOVERNMENT TELEGRAPH SERVICE FOR

1899-1900.

The *tubular statement* prefacing this report shows the total mileage, &c., of telegraph lines constructed and operated by the Government: such others as have been subsidized, or constructed and transferred by the Government for operation by private companies, since the inception of the service, will be dealt with in a separate report.

The matter in the following pages has reference only to the lines that are operated by or for the Government, and in any case where a line mentioned in the list is in no wise particularly dealt with, the understanding intended to be conveyed is that it has been satisfactorily operated throughout the year without any change of conditions since last made mention of in the annual reports.

As usual, with few exceptions these land lines and cables were kept in good order throughout the year: such renewals and general repairs as were made are hereafter noted in detail.

The expenditure and revenue for each of the several lines will be found in a tabular statement following these notes of what was done in the course of the year.

## NEWFOUNDLAND.

The line from *Port-au-Basque to Cape Ray* continues to be operated as heretofore under an arrangement with the Anglo-American Telegraph Co.

## MARITIME PROVINCES.

*Mabou-Cheticamp Line*.—The office at *Grand Etang* closed in January 1899 on resignation of the agent, was reopened in January 1900 with A. Doucet as agent-operator.

*Cheticamp-Meat Cove*.—Pursuant to what was noted last year, the construction of a line between these points was begun in December 1899 and carried on by day labour under the foremanship of the Western Union Telegraph Co's lineman, Mr. J. F. McMillan, who had charge of the recent repoling of the Mabou-Margaree station. The poles used in the building of this line were of native spruce 23 feet long and 5 inches diameter at the top, supplied and distributed at distances of 55 yards apart (= 32 per mile) by residents along the route. The line material consisted of No. 8 galvanized iron wire, No. 9 tie wire. The porcelain insulators, oak screw brackets and 5 and 6 inch wire nail.

An office was opened on the 14th April 1900, with Mrs. D. Smith as agent-operator at *Pleasant Bay*, 27 miles from Cheticamp and the further construction was carried out in the course of the season.

(*This line was completed to Meat Cove on the 1st September 1900. Total length 46 miles, including a loop off the main line to Bay St. Lawrence Lighthouse a distance of two miles.*)

*North Sydney-Meat Cove Line*.—In consequence of some unsettling of the recently renewed pole line and the growth of branches here and there interfering with the proper working of the wire in this section, arrangements were made to have the whole given a general overhauling by a repair gang under the foremanship of the Western Union lineman, following on the completion of the work of construction between Cheticamp and Meat Cove. (*Note this general repair work was duly taken in hand in August and was completed in October 1900.*)

The office at *South Gut St. Ann's* was closed at the end of December 1899, on the resignation of the agent Miss E. Morrison.

In May 1900 a permit was granted to the *Inverness and Victoria Telephone Company* to string a wire on the Government Telegraph pole line, from Baddeck via Englishtown and New Campbellton to North Sydney; the condition being stipulated that the telephone rates must be at all times satisfactory to the Minister of Public Works. In the course of the summer the company strung a wire accordingly. For a distance of about 2 miles from Baddeck it is carried on cross arms, thence to North Sydney on brackets.

At *Baddeck* a number of new poles (in all 14) of larger dimensions than those used along the line were put in, and the wires within the town limits restrung, a portion of the material from the discontinued Port Bevis loop line being utilized for this purpose.

*Barrington-Cape Sable Line.*—(Leased to local Telephone Co.) The cable across Bear Point Channel 1  $\frac{1}{2}$  miles became interrupted on the 25th October 1899. The SS. "Newfield" happening to be in the vicinity was directed to make the repair there as well as in the Cape Sable section mentioned in last year's report, and communication was restored on the 6th November.

*Bay of Fundy Lines.*—The cable between Cheney's Island and Whitehead Island,  $\frac{3}{4}$  mile, became inoperative on the 30th August 1899. It was put in order again by the SS. "Newfield" on the 30th October. The entire line however of which it forms a part was found to be working unsatisfactorily, the instruments (telephones) having become greatly deteriorated. A new outfit for the three offices (Grand Harbour, Cheney's Island and Whitehead) was procured from the New Brunswick Telephone Co. of St. John New Brunswick and the whole made satisfactory in December.

*Digby Cables.*—The cable between Long Island and Digby Neck,  $\frac{1}{2}$  mile; one of the two laid by the Government in 1889 as a bonus to the Westport and Digby Telephone Co.; was broken in June 1899 and when the SS. "Newfield" chanced to be in the vicinity on other cable work, the repair of this short section was attended to and communication restored on the 26th October. The same cable was reported to have been broken again in the following month but was soon after repaired by the Company.

At *Seal Cove*, the office was resigned by Mr. P. Russell and was put in charge of Capt. J. Ingersoll on 22nd September 1899.

*Chatham-Escominac Line.*—This line was, in October 1899, given such general repairs as were found to be needed.

A permit was granted the *Miramichi Telephone Co.*, in May 1900, to hang a wire on the telegraph pole line between Chatham and Black Brook.

*Partridge Island Quarantine Station N. B.*—A requirement having arisen for the establishing of telephonic connection with Partridge Island, an arrangement was made with the New Brunswick Telephone Co. for the requisite land line and instruments to connect with their exchange at St. John N. B. for an annual rental, to be met by the Department of Agriculture. To complete the connection a length of 4,500 feet of cable (deep sea g. p. gulf type) was shipped from Halifax and laid, in December, under the superintendence of Mr. D. C. Dawson, superintendent of telegraphs at St. John. The line was completed and put in operation in March 1900.

*Casapedia Line.*—In July 1899 this telephone line, which was erected by the G. N. W. Telegraph Co. in 1886 for the use of the Governor General between New Richmond and the Lodge, was overhauled and put in order.

#### RIVER AND GULF ST. LAWRENCE.

*Anticosti Island Lines.*—The cable between S. W. Point and the mainland at Gaspé which was overhauled at the Anticosti landing and put in order in October 1898, again developed some intermittent trouble in September 1899. It was visited by the steamer "Newfield" on the 17th October, but was then steadier and the brief recurrences of the interruption afforded no chance for satisfactory readings indicating the whereabouts of the existing defect. An attempt to clear it out was considered hopeless under the weather conditions obtaining so late in the season, and action was deferred. Thereafter however the trouble (disrupted circuit) became less frequent and it has since been thought advisable to leave the cable undisturbed until an actual total interruption requires its being taken in hand.

The services of *Electrician*, in the instance just recorded and subsequently in the same month in connection with the cables in the Bay of Fundy already mentioned, were performed by Mr. F. A. Hamilton electrical engineer of Halifax, N. S., who was temporarily engaged to accompany the ship.

The cable between Long Point of Mingau and Mechastic Bay, Anticosti : ceased working on the 6th December 1899. Examinations as far as practicable were made at the landings without any damage being found, and further action was postponed for the winter. [The steamer "Newfield" visited the locality in July of the present year (1900), after having restored the Manicouagan-Godbout connection, and made the required repair. The cable was parted in deep water about 6 miles off Long Point and it repeatedly broke when being picked up by the ship. The sheathing wire, No. 8 galvanized iron was badly corroded in spots. The repair was completed and communication restored on the 3rd August. A leak was then found to exist near the Long Point end, but in consequence of there being an insufficient length of cable available on the ship to warrant cutting in again, the circuit was left in that condition. It has since been improved by a special connection with the sheathing for return and working satisfactorily so that it need not be disturbed again till another rupture calls for its being overhauled.]

Owing to some delay attending the procuring of the requisite material, the renewal of the line wire between Becscie River and English Bay, referred to in the last annual report, was not got in hand up to the end of the fiscal year. All arrangements were however completed to have the work done as early as practicable.

At *Fox Bay*, in consequence of there being no suitable house available for the agent-operator, the office was closed for the winter, from the 1st December, 1899, till the 1st April, 1900, when it was re-opened with the same agent, Geo. Cabot, in charge.

On the 28th November, 1899, the service was deprived of one of its most valuable officers, by the death of Mr. Herbert Pope, *District-Superintendent* at South West Point. The duties of the office were assumed and have been efficiently discharged by Miss G. Pope, in conjunction with those of her position as chief-operator, pending a definite appointment being made by the department.

NOTE.—This arrangement was unchanged at the close of the fiscal year.

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# TELEGRAPH CHART

## GULF OF ST. LAWRENCE

AND  
MARITIME PROVINCES

Nautical Miles



### REFERENCES

*Anticosti and North Shore Telegraphs*  
The Government Lines start from Gaspe Basin  
and from Murray Bay on North Shore

Government Telegraph lines

Foreign lines

Telegraph line from Quebec to Murray Bay

*Magdalen Islands Lines.*—The cable between Old Harry and the mainland at Meat Cove continues in the condition mentioned in last year report. It has been satisfactorily operated and nothing was done to it since.

The section of land line along the sand bar, between Amherst and Etang du Nord, referred to in last year's report, was rebuilt early in the spring, the bar having made up again very considerably; and in view of former experience there was a reasonable expectation that this pole line might hold out, and it was thought advisable to defer steps towards putting down a cable as was contemplated. The pole line was however subject to frequent but brief interruptions in the course of the season. Another year will probably determine the question as to the advisableness of substituting a cable for the present means of connection.

*House Harbour Office.*—For the readier handling of messages exchanged with the office at House Harbour which has heretofore been on a branch line operated from the office at Grindstone West a move has been made to connect it by a loop from off the main line. The requisite length of cable ( $\frac{1}{2}$  knot) and other material for this purpose is being provided, and the change is to be made as early as practicable. The single cable of the existing connection was broken by ice on the 5th May, but as soon as it could be got at, three days later, it was repaired and the communication restored.

*Grand Entry.*—For the convenience of those doing most of the business of the locality, the Grand Entry office was removed to the Point for the summer months, in charge of the Grand Entry agent.

*Land Lines.*—A heavy sleet storm, on the 9th April, did great damage to the land lines generally on the Magdalen Islands. At Grosse Isle nearly every pole was thrown down. Repairers, however, promptly got the work in hand, and by the 26th all was in working order again, with the exception of the Etang du Nord sand bar section which was soon afterwards restored.

*St. Paul's Island Line.*—The condition of the St. Paul's Island cable continues unchanged. Nothing was done to it, and it was operated as usual throughout the year.

*North Shore Lines.*—In the course of the summer and fall of 1899, the line between Bay St. Paul and Chicoutimi was overhauled by a repair gang and put in thorough good order.

At *Lacruche*, the office which had been closed since December 1898 was reopened on the 2nd December 1899, with Mr. Alphee Gauthier as agent-operator.

At *St. Alexis*, the agent-operator, Mr. O. Pelletier, resigned the office 1st November 1899, and was succeeded by Mrs. D. Simard.

*Telephone Wires.*—Under an agreement dated 20th May 1899, between the Department and Mr. H. Lemieux, of Murray Bay, proprietor of a local telephone system, a permit was granted for the stringing of a telephone wire on the Government telegraph pole line between Bay St. Paul and St. Uabain, and between Murray Bay and St. Siméon.

At *Bersimis*, Miss Alphonsine Lausier took the position of assistant operator on the decease, in December, of Mrs. Lausier who had been acting in that capacity. A little later on, in February, Miss Lausier was also carried away by

death; and since that time the agent has engaged assistants temporarily pending some settled arrangement.

At *Rivière aux Canards*, N. Caron resigned the position of lineman at the end of June, and was succeeded by Elie Bouillianne from the 1st September 1899.

At *St. Etienne*, the office was closed on the 1st December 1899 for the winter. It was reopened in the summer of 1900. This office is operated for special accommodation without commission, but in connection therewith the operator at *Rivière aux Canards* is given an extra allowance for relaying the business of the branch line.

*Manicouagan-Godbout*.—The cable between Manicouagan and Godbout which was put in order on the 11th October 1899 as mentioned in last year's report, became again interrupted on the 27th April following. So far as local investigation could determine, the cable was parted beyond the shores, and as early as practicable, the services of the str. "Newfield" was secured and the requisite repair effected.

NOTE.—The "Newfield" arrived at Godbout on the 7th July (1900). The trouble was found about 11½ miles from the Godbout end, and was caused by complete attenuation of the conductor at a point exposed by abrasion of the core from broken and corroded sheathing wires. In the course of the repairs, which was completed on the 12th July, a total length of nearly 4 miles was overhauled; and in relaying it, an aggregate of 1 mile of broken portions was replaced by cable in good condition.

*Boat service pending cable repairs*.—In consequence of the above cable being interrupted concurrently with the Long Point-Anticosti section, the North Shore line below Manicouagan was cut off, between the above dates (27th April till the 12th July), but in the meanwhile there were boat services established between Godbout and Manicouagan, and between Long Point and Anticosti, for the exchange of messages as expeditiously as possible, depending on the conditions of wind and weather.

*General repairs*.—As usual, in the course of the year, an examination and general overhauling of the line from Point des Monts to Point Esquimaux was made by a repair gang and any required painting of canoes and repairs to shelter huts, bridges, &c., were incidentally attended to. There was no special work of renewals called for, and the whole has been satisfactorily operated.

At *Pentecost*, in the course of the year some painting and minor repairs necessary to the preservation of the telegraph office building were arranged for and duly effected.

*Construction*.—Owing to the backwardness of the season, the transportation and delivery of the poles, arranged for as mentioned in last year's report, in time for the completion of extension to Chateau Bay as early as was counted on proved impracticable. The line has, however, been already built in several sections, with gaps intervening, the aggregate of which latter is estimated at 45 miles or so. Offices were opened as hereunder:

At *Point du Maurier*, about 48 miles below Romaine, on the 19th July 1900; and,

At *Baie des Moutons*, 57 miles farther down, on the 15th September 1900.

*Cable for Belle Isle*.—The submarine cable intended for the connection of Belle Isle with the mainland at Chateau Bay, was imported (23 knots deep sea and 2 knots locked armour shore end) in September. The Government cable ship "Newfield," however, when on the way from the Bay of Fundy to Halifax to



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receive it, ran ashore at Digby Neck in a fog and became a total wreck. There was no other cable ship readily available, and the season was too far advanced to admit of another vessel being suitably fitted out for the work, which might otherwise have been practicable with the cable gear and machinery that was promptly recovered from the wrecked vessel; so the cable is being held over, in tank at Halifax, to be laid next year.

*Grosse Isle, Quarantine Line.*—In consequence of the frequent recurrence of trouble in the cables of this system; as noted in previous annual reports; and in view of the promising character of the special locked armour type of cable that was put in at the landings of the Isle Reaux and St. François section in 1895; a proposal was favourably considered in the department for the betterment of the whole by changing the landing places at Orleans Island and Grosse Isle and putting down a  $\frac{1}{4}$  mile length of that special type of cable, as a shore section, in each instance. There was no provision made for the proposed outlay at the last session, however, and action was deferred.

*St. Francois, Isle Reaux.*—This cable section which was last repaired on the 27th April 1898 became interrupted again on the 23rd January 1900. It could not be got at till the river ice passed down in the spring. The trouble was then found about 800 feet out from the St. François shore and was removed by the local repairer, N. Roberge, on the 10th May.

*Land Line.*—In October 1899 the Land Line on Orleans Island was gone over, and received such general repairs as were found to be called for.

At *Grosse Isle*, Miss Philomène Langlois was succeeded by Miss Valarie Langlois as agent operator on the 1st March 1900.

*Isle Coudres, Telephone System.*—The cable between the Island and the mainland was supposed to be interrupted from the middle of September till the 27th October 1899 when on examination the trouble was found in the station instruments ashore.

*Signal Service.* For the purpose of expediting the transmission of vessel reports from the Gulf and River Flag Stations, which had hitherto been relayed at St. Flavie Junction because of the crush of traffic on the G. N. W. Telegraph system west of that point; an arrangement was made with the company for the stringing of an additional wire between Quebec and Ste. Flavie, a distance of 209 miles, making a direct connection through to Gaspé. The Government contributed the material (No. 6 Gale Iron line wire and white porcelain insulators), under an appropriation obtained last session, and the company performed the work of construction in the course of the present season (1900).

## ONTARIO.

*Pelee Island Line.*—As mentioned in last year's report the cable between the mainland and the Dummy light ceased working on the 14th November 1899. It was got at and communication restored a week later; but it only worked intermittently until the 23rd December when it gave out again and had to remain unattended to until the spring. On the 6th June (1900) it was again put into working order; the District Superintendent Mr. J. McR. Selkirk (Leamington) with the aid of the steamer "Energy," removed the cable ends from the ruins of the Dummy Light, which had been destroyed by fire on the 17th April; and, after cutting out all the damaged portions of the landward section, connected the Island main section through to Point Pelee by means of a reel of cable, comprising the  $1\frac{1}{4}$  knots left over after the general repair mentioned in the annual report for 1897-98, which was brought down from Amherstburg where it had been deposited

The proposed renewal of this cable, as mentioned in last years report, was provided for last session ; but the season was too far advanced to take action in the matter when the fund become available. The new cable will probably be imported in readiness to be put down in the summer of 1901.

In June 1900 the land line on Pelee Island was gone over from end to end, and cleared of all tree branches and growths that were found to be interfering or likely to interfere with the wire. The line was at the same time extended a further distance of one mile at the South End for the purpose of making connection with the Post Office, and on the 1st July the telephone agency was removed from Dr. F. B. McCormicks to the Post Office where Mr. T. W. Ferguson has since been in charge.

#### NORTH WEST.

*Qu'Appelle-Edmonton Line.*—In the autumn of 1899 there was considerable resetting of poles done all along this line, and where needed the growths of brush, wood, &c., likely, to interfere with the wire were cleaned out, and the whole put in good and reliable condition.

At *Edmonton*, in October 1899 the joint office (Government and C. P. R. Telegraph) which was located in a rented building, was removed to more suitable premises in a central locality.

*Pitt.* In pursuance of what was mentioned in last year's report, concerning the former office at Pitt, a decision was arrived at to abandon that site and continue the location of the lineman for that section at Onion Lake. Accordingly, in the course of the present season (1900) arrangements were made for the erection of a suitable building for the accommodation of the members of the staff at the latter place.

*Staff changes.*—In the course of the year the following transfers and appointments were ordered, and have since been made.

At *Moose*, J. T. Callahan, transferred to Onion Lake, was succeeded by J. W. Carroll, newly appointed as Agent-Lineman, 1st September 1900.

At *Onion Lake*, G. G. Mann resigned, was succeeded by H. McCleughan (transferred from Bresaylor) as Agent-Operator, 1st October 1900. And J. T. Callahan transferred from Moose) succeeded D. Noel (formerly at Pitt and now at Bresaylor) as Lineman, 1st September 1900. A building for office and dwelling is being put up at this place. See note under Pitt.

At *Bresaylor*, H. McCleughan, transferred to Onion Lake, was succeeded by D. Noel (formerly at Pitt) as Agent-Lineman, 1st October 1900.

At *St. Paul de Metis*, the office, which was opened in October 1897, for special accommodation and only to be in operation occasionally, was established as a regular office on 1st December 1899 with M. Therien as Agent-Operator.

*Industrial School, Saddle Lake.*—In May 1900 the department furnished the requisite material and two sets of telephone apparatus for a connection between the telegraph office and the Industrial school ; 6½ miles away but a short distance, however, off the line of telegraph. Incidentally, as the poles of the latter were too old and weak for the stringing of a second wire, a new lot of poles (tamarac, 153 in all) covering a distance of about 6½ miles, paralld to the telegraph line, were erected and then the telegraph wire was transferred to them which practically amounts to a reconstruction of that length and renders the whole reliable and satisfactory.

*Wood Mountain Line.*—In the course of the summer of 1900, the Wood Mountain line was thoroughly overhauled and put in good order. 36 new cedar

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poles, were put in, replacing some that had been destroyed by lightning and by fires; and a further quantity of 27 poles, the remainder of a carload procured from Rat Portage in May is being held in reserve at Moose Jaw for further requirements.

*Banff Telephone System.*—This system, of which mention was inadvertently omitted from last year's report, was inspected by the District-Superintendent (Qu'Appelle) in the autumn of 1898. The instruments were found to have become generally disarranged but were put in hands for repair and restored to working order, answering their purpose. It was found, however, that should the local requirements demand greater facilities or an extensions of the system in the Park, an entire new outfit of apparatus at each and all of the stations will have to be provided. The line itself was in good order. Nothing has since been done to it.

## BRITISH COLUMBIA.

*Barkerville Line.*—In consequence of a finding that the contemplated through connection for the Yukon line rendered an additional wire desirable in the stretch from Quesnelle to Ashcroft, the required repoling of the Barkerville line, mentioned in last year's report, is being provided for by the erection of a complete new line between these points, a distance of 215 miles, on to the poles of which the wire at present in use is to be or is now being transferred. The renewal of the poles along the remaining length from Quesnelle to Barkerville, 61 miles is being attended to in conjunction with the other work of construction.

In the course of the year there were frequent interruptions due to the decayed condition of the old poles; but repairs were made promptly and the line was upon the whole operated in a satisfactory manner.

At *Barkerville*, in the autumn of 1899, the Telegraph Office building which had fallen into disrepair was satisfactorily restored at an outlay of \$600.

At *Bridge Creek*, owing to the destruction by fire, of the building wherein the telegraph office was located (111 Mile House), the office was removed temporarily to the 108 Mile House and afterwards to 115 Mile House where the agent operator, Mr. R. M. Cornell, was succeeded by J. D. McIntosh, 1st January 1900.

*Nanaimo-Comox Line.*—The work of reconstructing a portion of this line between Quillicum and Union Bay, referred to in last year's report, was resumed in the spring and completed in the month of May.

*Victoria Cape-Beale Line.*—This line continued in uncertain operation until about the close of the fiscal year, since when it has been in fairly continuous operation, and the alternative route for messages opened up by the new line from Cape Beale to Alberni, mentioned in last year's report, has afforded satisfactory service with points reached along the coast.

At *Port San Juan*, J. W. Williams, Agent-Lineman, resigned 1st July 1900 and was succeeded by B. H. Kirkpatrick.

*William's Head Quarantine telephone line.*—A permit was granted to Messrs. Stuart & Crawley in September 1899 for a connection with this line, which runs part of the way from Victoria on the Cape Beale telegraph poles.

*Kamloops-Lower Nicola Line.*—This line, the completion of which was reported last year, has been in operation with several telephone connections, as shown on one of the appended tables.

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*Bennett-Dawson & Atlin Line (Yukon).* A tabular statement of mileage, offices established, staff employed, &c., in connection with this line, to which reference was made in last year's report will be found in the appendix.

The southern section of this system, to extend from Atlin to Ashcroft, has been under construction during the past season and will likely be completed early in 1901.

## TELEGRAPH SERVICE GENERALLY.

*Cable Ship.*—As mentioned in connection with the projected cable between the mainland of Labrador and Belle Isle, the Government cable ship "Newfield" was lost in the Bay of Fundy in September of this year (1900). As all of the cables of the service were in working order, there was no occasion for seeking a ship to replace her up to the close of navigation.

It may not be out of place to note here, that all of the Government cables in the Gulf and the River St. Lawrence and in the Bay of Fundy were laid by the wrecked vessel, whose services have all along been brought into requisition as occasion required for repair work. Of late years a good deal of this work has been taken in hand, and a great deal of credit is due to her commande, Captain J. H. Campbell, and to the Chief Engineer, Mr. C. E. Stewart, in their respective departments, for its skillful and painstaking performance.

## REVENUE AND EXPENDITURE.

The revenue and expenditure for each of the lines in the several districts hereinbefore mentioned are given in the following table :—

1899-1900.	Expenditure.	Revenue.	Remarks.
Lower St. Lawrence and Maritime Provinces :—			
Anticosti Island lines.....	4,593.73	1,172.86	Signal Service messages, Meteorological Service messages and reports, and Fisheries bulletins are handled free of tolls.
Bay of Fundy ".....	1,891.54	915.80	
Cape Ray ".....	250.00	.....	
Cape Sable ".....	25.00	.....	
Cheticamp ".....	1,138.72	394.28	
Escuminac ".....	497.71	104.39	
Low Point Agency.....	50.00	.....	
Magdalen Island lines.....	2,571.12	705.17	
Meat Cove line (including St. Paul's Island).....	2,080.19	621.09	
North Shore St. Lawrence (East of Bersimis).....	6,054.25	1,266.13	
North Shore St. Lawrence (West of Bersimis).....	4,493.45	1,023.54	
Quarantine line.....	933.92	587.28	
Cable ship <i>Newfield</i> , renewals of plant, etc.....	1,506.23	.....	
Subsidies, stationery, line and office material and contingencies, chargeable to appropriation for Gulf lines.....	3,661.50	.....	
Ontario, Pelee Island line.....	1,501.21	144.68	
North-West telegraph lines.....	15,277.55	1,651.09	
British Columbia, Comox (including Alberni line).....	4,244.64	2,152.74	
Alberni-Cape Beale.....	1,165.65	7.61	
Kamloops—Nicola.....	.....	65.28	
† Barkerville line.....	3,629.36	.....	
† Victoria Cape Beale line.....	4,494.42	.....	
(Yukon) Bennett-Dawson & Atlin.....	15,639.43	33,716.88	
Telegraph service generally.....	1,196.24	.....	
Total.....	76,965.46	44,528.82	

† The C. P. R. operating these two lines, retains the revenue, and the government reimburses them the excess of expenditure over revenue.

## DEPARTEMENTAL TELEPHONE SERVICE.

At the end of June 1900, the telephone connections with the central office of the Bell Telephone Co. at Ottawa, listed as chargeable to the special appropriation, numbered 160, the annual charge for which amounts to \$5,926. These connections are distributed amongst the several departments as hereunder :

Department.	Offices.	Residences.	Annual charge.	
Agriculture .....	3	3	\$215	00
Auditor General .....	1	1	75	00
Customs .....	2	1	115	00
Finance .....	2	1	85	00
Govt. House .....	3	5	250	00
House of Commons .....	8	3	410	00
Inland Revenue .....	3	3	235	00
Interior .....	8	3	410	00
Geological Survey .....	2		75	00
Mounted Police .....	2	1	120	00
Indian Affairs .....	5	1	195	00
Justice .....	6	5	430	00
Dominion Police .....	6	1	298	00
Marine and Fisheries .....	2	2	145	00
Militia and Defence .....	9	4	445	00
Post Office .....	4	1	180	00
Parliament Library .....	1	2	105	00
Privy Council .....	3	5	299	00
Railways and Canals .....	4	2	240	00
Secretary of State .....	2	3	180	00
Public Works .....	14	19	899	00
Ottawa River Works .....	3		155	00
Stationery Department .....	3	2	175	00
The Senate .....	3		120	00
Trade and Commerce .....	1	1	70	00
	100	60	\$5,926	00

## APPENDED TABLES.

The usual tabular statements of the lines and offices, staff, &c., of the telegraph service, following hereupon, will be found to contain whatever additions or changes have been made up to the 30th June 1900.

D. H. KEELEY,

*General Superintendent.*

Ottawa, 14th December, 1900.

## GOVERNMENT TELEGRAPH SERVICE.

## NEWFOUNDLAND TELEGRAPH SYSTEM.

Stations.	Inter- mediate Distance	Operator.	Salaries per Annum.	Date of Appointment.	Memo.
	Miles.		\$ cts.		
1 Port au Basque.....	0		50 00 or com'n		N. B.—The commission is 25 per cent upon all business to and from the office; said commission guaranteed not to be less than at the rate of \$50 per annum.
2 Cap Ray Lighthouse .....	14		50 00 "		
Total.....	14		100 00 "		

N. B.—The above short line is constructed in connection with the Signal Service, and connects at Port au Basque with the land line system of the Anglo-American Telegraph Company.

GOVERNMENT TELEGRAPH SERVICE.—Continued.  
ANTICOSTI TELEGRAPH SYSTEM.

Stations.	Inter- mediate Distance	Agent, and Operators.	Salaries per Annum.	Date of Appointment.	Memo.
	Miles.		\$ cts.		
1 *Fox Bay.....	0	Geo. Cabot .....	50 00 or com'n.	May 13, 1890.	The commission is 25 per cent on all busi- ness to and from the office in each in- stance; and commission guaranteed not to be less than at the rate of \$50 per annum.
2 Heath Point Lighthouse .....	23	T. Gagné .....	50 00	July, 20, 1881.	* A special allowance for maintenance of office, \$50 per annum, has been added to the commission for offices marked*, since September 1887.
3 South Point Lighthouse .....	324	A. Nadeau .....	50 00	Oct. 1, 1888.	
4 *Shallop Creek.....	17½	B. Bradley .....	50 00	July, 7, 1881.	
5 Salt Lake.....	524	{ Z. Beaudin, repairer, .....	365 00	May 6, 1886.	
		{ A. Beaudin, operator .....	50 00	" 12, 1886.	
6 South-W. Pt. Lighthouse.	15	{ Miss G. Pope .....	420 00	Oct. 18, 1880.	General repairer. Plus \$1 per d. when absent on duty.
		{ do Actg. D. Supt. ....	200 00		Chief operator since August 1, 1882.
7 Jupiter River.....	7	.....	50 00		Late D. Supt. Mrs. H. Pope, deceased 28th Nov. 1890. See note in body of report.
8 Otter River.....	17½	.....	50 00		
9 *Bessie River.....	22	.....	50 00		Temporarily closed since May 1890.
10 Cape Eagle (Elis Bay).....	10	.....	50 00		
11 West Point Lighthouse .....	9	A. Malouin .....	50 00	Aug. 1, 1881.	
12 English Bay .....	3	F. Cabot .....	120 00 and com'n.	July 1, 1882.	
13 Mechastic Bay.....	144	.....			
Totals.....	2234		1,605 00		
South-west Point connects with l'Anse à Fougère, Gaspé, by cable 4½ knots; and from Mechastic Bay connection is made with Long Point of Mingan by cable 21 knots					
1 L'Anse à Fougère.....		N. Bernier .....	17 00		Special allowance for the cable terminus. A testing station only.
2 Gaspé Basin .....	28	J. J. Annett.....	420 00	Oct. 16, 1881.	Transfer office. Connection with G. N. W. telegraph system.
	28		437 00		

# MAGDALEN ISLANDS SYSTEM.

## MAGDALEN ISLANDS SECTION.

No.	Stations.	Inter- mediate Distance	Agents and Operators.	Salaries per Annum.	Date of Appointment.	Memo.
		Miles.		\$ cts.		
1	Amherst .....	0	Miss J. Shea .....	50 00 or com'n .....	Oct. 1, 1882	The commission is 25 per cent. on all business to and from the office in each instance; said commission guaranteed to be not less than at the rate of \$50 per annum.
2	Amherst Lighthouse .....	9	Wm. Cormier .....	50 00	June 11, 1881	
3	Etang du Nord village .....	15	{ P. Pelletier, line-man Mrs. A. Binet .....	400 00	Dec. 1, 1881	Plus \$20 per annum for rent.
4	Etang du Nord lighthouse	1	N. Arseneault .....	50 00	1, 1881	
5	Grindstone Island .....	5	W. Leslie .....	50 00	Sept. 1, 1891	Two-wire loop line.
6	Grindstone West .....		{ A. LeBourdais, D. Spt. M's. F. LeBourdais, op.	Com'n 25 p. c. 600 00	May 20, 1897 Aug. 17, 1880	Plus \$1 per day when absent on duty.
7	House Harbour (1/4 knot cable) .....	3	P. L. Joncas .....	50 00 or com'n .....	Sept. 15, 1893	
8	Wolfe Island .....	28 1/2	N. Clark .....	200 00 and com'n .....	June 1, 1888	
9	Grosse Isle .....	11	Mrs. F. Atkins .....	50 00 or com'n .....	Feb. 18, 1882	
10	Grand Entry .....					
	Totals .....	83 1/2		1,550 00		



GOVERNMENT TELEGRAPH SERVICE. — *Continued.*

## MAGDALEN ISLAND SYSTEM.

## CAPE BRETON SECTION.

No.	Stations.	Inter- mediate Distance	Agents and Operators.	Salaries per Annum.	Date of appointment.	Memo.
		Miles.		\$ cts.		
1	Meat Cove (Cable station)	0	A. B. McDonald	500 00	Nov. 7, 1880	The commission is 25 per cent on all business to and from the office in each instance; said commission guaranteed to be not less than at the rate of \$50 per annum.
2	Aspy Bay	10½	I. Y. Nichols	50 00 or com'n.	July 1, 1894	
3	Dingwall (loop line) .. }	3½	Murdoch McLeod	50 00	Aug. 31, 1898	The loop line formerly running to White Point, has been withdrawn.
4	Nell's Harb'r { ¼ way to se }	14	M. McLeod	50 00	April 1, 1887	
5	Ingonish North Bay	9	J. M. Burke	50 00	" 1882	
6	South Ingonish	10½	Geo. Brewer	50 00	May 7, 1890	
7	French River ¼ knot cable	2½	John McDonald	50 00	April 1, 1880	
8	Englishtown ¼ knot cable	11	W. Bingham	120 00	July 19, 1882	Switching point for Baddeck line
9	South Gut, St. Ann's (on loop)	5		50 00	"	Closed 31 December 1899.
10	Baddeck (on loop)	13	A. Anderson	50 00	Dec. 2, 1898	
11	Englishtown (back on loop)	18				This loop to Baddeck starts from and returns to Englishtown.
12	Kelley's Cove (N. Campbellton)	6	Miss M. Campbell	50 00	April 1, 1885	
13	Big Bras d'Or ¼ knot cable North Sydney	2½	Mrs E. Livingston	50 00	Jan'y, 1, 1889	
		12½	W. U. Tel. Co.	Commission only.		The commission is 50 per cent on local business and 25 per cent on through messages; and covers supervision of line and office accommodation at North Sydney.
	<i>Repairs Section.</i>					
	Meat Cove—Sugar Loaf		M. McAskill	80 00	April, 1 1898	
	Sugar Loaf—Ingonish		Charles Smith	80 00	" 1 1898	
	Ingonish—Englishtown		R. A. McDonald	80 00	" 1 1898	
	Englishtown—Baddeck		D. Morrison	60 00	" 1 1898	
	Englishtown North Sydney		J. Campbell	60 00	May 1 1899	
	Totals	143½		1,480 00		

Meat Cove station connect with the Magdalen Islands system by a cable to Old Harry Head, 35 knots, and with St. Paul's Island by a cable of 20 knots. The latter is operated with telephones.

## GOVERNMENT TELEGRAPH SERVICE—Continued.

## NOVA SCOTIA TELEGRAPH SYSTEM.

## CAPE SABLE SECTION.

No.	Stations.	Inter- mediate Distance	Agents and Operators.	Salaries per Annum.	Date of Appointment.	Memo.
		Miles.		\$ cts.		
1	Barrington .....	0				This line has been leased to the Barrington Telephone Company from August 12th 1897. The lease is terminable at any time.
2	Newellton (including 1½ knots cable) .....	11				
3	Cape Sable Island light- house (including 1½ mile cable) .....	6½				
	Totals .....	17½				

## EAST COAST SECTION.

N. B.—In connection with the Signal Service, a land line, 298 mile<sup>s</sup> in length was erected in 1881, between Canso and Halifax, for a bonus of \$16,000, and is maintained and operated by the Western Union Telegraph Company, without further cost to the Government.

GOVERNMENT TELEGRAPH SERVICE.—Continued.

MABOU-CHETICAMP, C.B., TELEGRAPH SYSTEM.

No.	Stations.	Intermediate Distances.	Agents and Operators.	Salaries per Annum.	Date of Appointment.	Memo.
		Miles.				
1	Mabou .....	0	Mrs. M. McDonald .....	\$120 per annum .....	April 1, 1887 .....	The commission is 25 p.c. of the Government line tolls, and is guaranteed to amount to not less than \$50 per annum. Where 50 p.c. commission is paid there is no guarantee as to amount.
2	Broad Cove .....	20	Mrs. Annie McLelland .....	\$50 or commission .....	March 1, 1892 .....	
3	S.W. Margaree .....	12	J. D. McFarlane .....	\$50 .....	Feb. 1, 1898* .....	
4	Margaree Harbour .....	5	H. K. McLean .....	\$50 .....	Oct. 20, 1896 .....	
5	N.E. Margaree (loop line wire) .....	10	Mrs. J. D. Ross .....	\$50 .....	Feb. 1, 1908 .....	
6	Grand Etang .....	8	A. Doucet .....	\$50 .....	Jan. 1, 1900 .....	This office was closed for a year from January, 1899.
7	Cheticamp .....	8	Mrs. M. Fiset .....	\$100 .....	Jan. 1, 1887 .....	*At S.W. Margaree the commission was 50 per cent till 1st September, 1896.
	Totals .....	63	D. C. Dawson, D. Supl. ....	\$150 .....	Jan. 1, 1887 .....	
	Totals .....			\$570 per annum.		

CHATHAM-ESCUMINAC, N.B., TELEGRAPH SYSTEM.

1	Chatham .....	0	Great North-western Telegraph Co. ....	\$185 .....		This amount is paid for supervision of the line and office accommodation at Chatham. The commission is 25 p.c. of the Government line tariff receipts in each instance, and is guaranteed to amount to not less than \$50 per annum.
2	Black Brook .....	5½		\$50 or commission .....		
3	Baie du Vin .....	15	Miss M. Williston .....	\$50 .....	March 1, 1885 .....	
4	Lower Hardwicke .....	6	Mrs. M. Brimmer .....	\$50 .....	Aug. 1, 1891 .....	
5	Escuminac .....	3½	D. Lewis .....	\$50 .....	Sept. 1, 1885 .....	
6	Point Escuminac light-house .....	12	K. R. McLennan .....	\$50 .....	Nov. 1, 1893 .....	\$12 per annum allowed for care of main battery at Point Escuminac.
	Totals .....	42		\$435 .....		

GOVERNMENT TELEGRAPH SERVICE.—*Continued.*

## GROSSE ÎLE QUARANTINE TELEGRAPH SYSTEM.

Stations.	Inter- mediate Distance	Agents and Operators.	Salaries per Annum.	Date of Appointment.	Memo.
	Miles.		\$ cts.		
1 Quebec .....	0	Great North-west'm Tele- graph Co. ....	185 00	.....	This amount is paid for supervision of the line, and covers rent of pole line from Quebec to L'Ange Gardien, for which \$25 per annum is charged.
2 L'Ange Gardien .....	13				
3 Orleans Island landing (cable) .....	3				
4 St. Pierre .....	33	C. Turvott .....	50 00 or commission ..	March 1, 1885.	This commission is 25 per cent of the Gov- ernment line tariff in each instance, and guaranteed to amount to not less than \$50 per annum.
5 St. Jean .....	7	P. Pouliot .....	50 00 or commission ..	Nov. 1, 1807.	
6 St. François .....	63	H. Lemelin .....	50 00 ..	March 1, 1900.	
7 Isle Réaux (including 2 knots cable) .....	33	M. Plante .....	50 00 ..	April 7, 1896.	
8 Isle Réaux (land line) ..	23	M. Gobeil .....	120 00 and 25 p. c. com- mission .....	Sept. 15, 1888.	
Grosse Isle quarant. office (includ. 2 knots cable) ..	33	P. Pouliot .....	120 00 and 25 p. c. com- mission .....	July 1, 1888.	
Quarantine telephone sys- tem 2-wire line .....	13	J. P. Langlois, operator .. M. Langlois, agent .....	50 00 ..	Sept 1, 1885.	\$12 per annum allowed for care of main battery at Grosse Isle.
	523		625 00		NOTE.—The telephone system on Grosse Isle since May 1892, has comprised 14 mile of 2-wire line, with 11 connections or stations.

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BAV OF FUNDY, N.B., TELEGRAPH SYSTEM.  
GRAND MANAN SECTION.

Stations.	Inter- mediate Distance	Agents and Operators.	Salaries per Annum	Date of Appointment	Memo
<i>Long Eddy Cable Hut, to</i>	Miles.		\$ cts.		
1 Flagg's Cove.....	"	Mrs. C. C. Seely (1, Sept.)	540 00	Nov. 18, 1880	The commission is 25 p. c. upon all business to and from the office in each instance; said commission guaranteed not to be less than at the rate of \$30 per annum. When 50 p. c. commission is paid there is no guarantee as to amount.
" ".....	"	Miss M. E. Burnham.....	50 00 or com'n.....	Oct. 1, 1898	
" ".....	"	A. Gilmore, repairer.....	60 00	Dec. 1, 1894	
2 Castalia.....	2½	G. E. Dalzell.....	Com'n, 25 per cent. ....	June 1, 1898	\$25 per annum is included for repeating Whitehead br. Southern Head office is now operated by telephone from Seal Cove.
3 Woodward's Cove.....	3½	W. A. Fraser.....	50 "	Feb. 28, 1893	
4 Grand Harbour.....	2	J. L. Newton.....	75 00 or com'n.....	Apr. 1, 1887	
5 Seal Cove.....	4½	J. Ingersoll.....	50 00	Sept. 22, 1890	
6 South in Head Light-house	5½	O. McLaughlin.....	Com'n, 25 per cent. ....	Apr. 24, 1897	
<i>Branch Line.</i>					
Grand Harbour.....	0				
Cheney's Island (¼ knot cable).....	¼	W. Cheney.....	Com'n, 25 per cent. ....	Feb. 1, 1891	
Whitehead Island (¼ knot cable).....	¼	I. D. Harvey.....	50 00 or com'n.....	June 1, 1898	
Totals.....	27½		825 00		

## CAMPOBELLO SECTION.

<i>Liberty Cove Cable Hut, to</i>	
1 Welchpool.....	7½
2 Eastport, Maine, U.S.A.....	1
Totals.....	8

Miss E. G. Vennell.....	Sept. 1, 1895
J. Cushing.....	Dec. 26, 1881
210 00 and com'n.....	
200 00	
410 00	

A cable of 1½ knots connects Welchpool with the landing ¼ mile from Eastport; and a cable of 7¼ knots is laid from Long Eddy, Grand Manan, to Liberty Cove, Campobello.

GOVERNMENT TELEGRAPH SERVICE. — *Continued.*

## CHICOUTIMI AND NORTH SHORE OF ST. LAWRENCE TELEGRAPH SYSTEM.

## CHICOUTIMI SECTION.

Stations.	Inter- mediate Distance	Agents and Operators.	Salaries per Annum.	Date of Appointment.	Memo.
	Miles.		\$ cts.		
1 Bay St. Paul .....	0	F. Boivin .....	180 00 per annum . . .	Previous to April 1, 1885.	*The commission upon business is 25 per cent of the Government tolls of the line; the amount guaranteed to be not less than \$50 per annum.
2 St. Urbain .....	9	A. Boivin .....	25 p. c. commission . . .	April 1, 1885.	
3 La Cruche .....	37	Alphée Gauthier .....	50 00 " " " " " "	Dec. 2, 1886.	
4 St. Alexis .....	314	A. Gauthier (repairer) ..	210 00 " " " " " "	May 15, 1887.	
5 St. Alphonse de Bagotville ..	3	Mrs. D. Simard .....	50 00 or commission . . .	Nov. 1, 1886.	
6 Chicoutimi .....	114	A. Simard .....	50 00 " " " " " "	April 1, 1885.	
Br. Line { 7 St. Alexis, .....	0	G. N. W. Tel. Co. ....	25 p. c. commission . . .	Nov. 1893.	Plus \$12 per annum for care of main battery. J. Fortin's division includes the branch line to L'Anse St. Jean. Plus \$12 per annum for care of main battery.
{ 8 L'Anse St. Jean, .....	40	J. Fortin (repairer) .....	420 00 per annum . . .	June 1, 1897.	
		Mrs. R. Martel .....	50 00 or commission . . .	Aug. 1 1897.	
Totals .....	132		1,060 00		

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GOVERNMENT TELEGRAPH SERVICE—Continued.  
CHICOUTIMI AND NORTH OF ST. LAWRENCE TELEGRAPH SYSTEM—Continued.

## NORTH SHORE (West of Bersimis).

No.	Stations.	Inter- mediate Distance	Agents and Operators.	Salaries per annum	Date of Appointment.	Memo.
		Miles.		\$ cts	Previous to	
1	Murray Bay.....	0	Mrs. F. Vincent.....	50 00 or comm'n.....	April 1, 1885	
2	Cap à l'Aigle.....	4	N. Duchesne.....	50 00 "	June 1, 1888	
3	St. Fidèle.....	6	A. N. Parent.....	50 00 "	April 1, 1890	
4	Port au Persil.....	7	{ A. Brassard (repairer). A. Brassard (repairer).	50 00 "	May 1, 1880	
5	St. Siméon.....	4	D. Gaudin.....	210 00 "	June 1, 1897	
6	Baie des Rochers.....	12	G. Savard.....	50 00 "	Dec. 1, 1887	
7	Riv. aux Can. } Branch L.		{ G. Bouillenne.....	100 00 "	June 1, 1887	
8	St. Étienne.....	17	{ F. Bouillanne (repairer) F. Bouillanne (repairer).	210 00 "	Nov. 1, 1890	
9	Tadoussac (14 knot cable).	13	J. E. Caron.....	50 00 or comm'n.....	Sept. 1, 1898	Mr. Bouillenne at River Canard has acted as repeating operator for the St. Étienne branch since August, 1889.
10	Bergeronnes.....	15	M. Savard.....	50 00 "	Nov. 1, 1885	
11	Escoumains.....	12	J. H. Topping.....	50 00 "	May 1, 1885	
12	Baie de Bacons.....	8	P. Bouchard.....	50 00 "	May 6, 1892	Commission, at 25 per cent, without guarantee at Baie des Bacons.
13	Mille Vaches.....	8	J. A. Puise.....	50 00 or comm'n.....	April 1, 1885	Closed November, 1895.
14	Portneuf Mills.....	11½	{ S. Bouchard.....	50 00 or comm'n.....	July 1, 1890	
15	Portneuf light.....	6	{ E. Courbron (repairer) E. Courbron (repairer).	420 00 "	April 1, 1888	
16	Sault au Cochon.....	7	{ A. Lausier (sgt. and op.) A. Lausier (sgt. and op.)	500 00 "	Sept. —, 1890	Sault au Cochon closed September 30, 1890. Formerly located at Manicouagan; Bersimis is now the repeating office. Late assistant operator, Mrs. Lausier, deceased in December 1890.
17	Bersimis.....	31	F. Poppe, dist. supt.....	600 00 "	April —, 1885	
*Totals.....				2,820 00		

\*NOTE.—In the estimates the maintenance of the Chicoutimi and North Shore lines is provided under head of North Shore Line. They are operated conjointly.

GOVERNMENT TELEGRAPH SERVICE. — *Continued.*  
CHICOUTIMI AND NORTH OF ST. LAWRENCE TELEGRAPH SYSTEM — *continued.*  
NORTH SHORE (East of Bersimis).

Stations.	Inter- mediate Distance	Agents and Operators.	Salaries per Annum.	Date of Appointment.	Remarks.
1 P'te aux Outardes (cable)	12	H. Tremblay.	50 00 or comm'n <sup>s</sup> .	Dec. 1, 1896.	
2 P'te Paradis, Manicouagan	18	N. A. Concan.	50 00 or comm'n.	Oct. 15, 1883.	
3 River Godbout (cable)	26	L. R. Fafard.	50 00 do	Dec. 28, 1883.	
4 Pointe des Monts.	181	Z. Poulin.	50 00 or comm'n.	May 16, 1884.	The repeating office formerly at Manicouagan was removed to Bersimis in September, 1896.
5 Trinity Bay West.	31	A. Bilodeau.	Commission only.	do 1, 1880.	
6 Trinity Bay East.	26	I. Concan.	do	Sept. 1, 1880.	
7 Carleton Islands.	7	Paul Côté.	Accommo. office.	Jan. 10, 1895.	No commission is paid at this office.
8 Pointe aux Anglais.	101	E. H. Têtu, D. Supl.	1,080 00 per annum.	Nov. 1, 1891.	
9 Pentecost River.	63	A. Theriault.	180 00 do	July 1, 1888.	
10 Stc. Marguerite.	47½	P. E. Vignault, opr.	180 00.	Jan. 2, 1884.	
11 Seven Islands.	22½	F. Gahenne, lineman.	540 00.	April 22, 1890.	Plus 50 cents per day when absent on duty.
12 River Moisie.	15½	J. Poirier.	50 00.	June 1, 1890.	
13 Sheldrake.	72	A. LeBerge.	50 00 or comm'n.	Oct. 1, 1897.	
14 Thunder River.	64	Mrs. H. Cody.	50 00 do	Feb. 1, 1890.	
15 Magpie.	14	Geo. Molloy.	50 00 do	Oct. 1, 1889.	
16 St. John's River.	9	B. Chambers.	50 00 do	do 1, 1889.	
17 Long Point.	10	A. Maloney.	330 00.	do 1, 1889.	
18 Mingan.	7	M. J. Maloney.	50 00 or comm'n.	Sept. 21, 1896.	Long Point is the repeating office for the Atlantic cable in operation since Sept. 1, 1891.
19 Pointe aux Esquimaux.	24	D. C. Hould.	Commission only.	Oct. 1, 1889.	The commission at Point aux Esquimaux is 50 per cent, without guarantee as to amount.
20 Piastre Bay.	43	S. Tanguay.	50 00 or comm'n.	May 21, 1893.	
21 Aguanus.	26½	L. Cummings.	100 00 do	Sept. 1, 1897.	
22 Natashquan.	16	E. Vignault.	50 00 do	Oct. 2, 1897.	
23 Kagaska.	33	A. Cormier.	50 00 per annum.	Sept. 16, 1898.	
24 Big Roname.	43	Miss R. A. Blais.	50 00 or comm'n.	Jan. 1, 1899.	
25 Pointe du Maurier.	48		50 00 do	Sept. 21, 1898.	
26 Baie des Moutons.	57		50 00 do	July 19, 1900.	
	611½		3,310 00	Sept. 15, 1900.	

NOTES. — \*The commission, except where otherwise stated, is 25 per cent of the Government line tolls on business handled. † This line is being further extended towards Belle Isle.



## SESSIONAL PAPER No. 19

## GOVERNMENT TELEGRAPH SERVICE—Continued.

## ONTARIO PEEBEE ISLAND TELEGRAPH SERVICE.

No.	Stations.	Inter- mediate Dis- tances.	Agents.	Salaries per Annum.	Date of Appointment.	Memo.
		Miles.				
1	Leamington .....		J. McR. Selkirk, D. Supt.	\$50 00.	Nov. 1, 1888.	
2	Leamington Dock .....	2 1/2	F. Deslauriers .....	Accommodation office .....	Nov. 1, 1893.	
3	Club House .....	5	C. Harrison .....	Commission 25 p.c. ....	April 1, 1889.	
4	Point Pelee .....	5	W. A. Grubb .....	" .....	Nov. 1, 1888.	
5	Dummy Light (cable) .....	12				
6	Lizard Point Landing (cable) .....	7 1/2				
7	North Point Lighthouse .....	1	J. R. Ledwell .....	" .....	June 1, 1899.	
8	North Dock .....	2	C. B. Quirk .....	" .....	Nov. 1, 1888.	
9	McIntyre's Corners .....	2 1/2	Mrs. A. McIntyre .....	" .....	" 1, 1896.	
10	West Dock .....	2 1/2	A. M. McCormick .....	" .....	" 9, 1888.	
11	South Dock .....	5 1/2	T. W. Ferguson .....	" .....	July 1, 1900.	
	Totals .....	35		\$100 00		

The commission is on the tolls for the Government line.  
Closed. Destroyed by fire in April, 1900.

NOTE.—This line is operated with telephones.

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## LINES IN THE NORTH-WEST TERRITORY.

No.	Stations.	Inter- mediate Distance	Agents.	Salaries per Annum.	Date of Appointment.	Memo.
	<i>Qu'Appelle-Edmonton Section.</i>	Miles		\$ cts.		
1	Qu'Appelle .....	0	{ J. S. Macdonald, D. Supt. C. P. R. Tel. Co. ....	1,200 00 Jan. 1, 1898.		The Agent-Oper. at Qu'Appelle is joint with the C.P.R.
2	Fort Qu'Appelle .....	17	{ H. J. Macdonald, linem'n Miss E. Johnston .....	420 00 Dec. 1, 1896. 300 00 Dec. 1, 1899.		
3	Touchwood .....	46	{ A. Von Lindeburgh .....	600 00 March 1, 1885.		
4	Humboldt .....	78	{ C. P. R. Tel. Co. ....	600 00 Nov. 1, 1883.		
5	Saskatoon (14 mil's loop) .....	69	{ J. Harrington, repairer W. Salsbury .....	300 00 Jan. 1, 1892. 600 00 " 1, 1888.		Humboldt office was closed August 20, 1893. The Agent-Oper. at Saskatoon is joint with the C.P.R.
6	Henrietta .....	52	{ L. P. O. Noel, .....	720 00 Oct. 1, 1886.		
7	Battleford .....	47	{ H. McClenehan .....	720 00 April 15, 1890.		Closed since October 1898 Lineman thereafter stationed at Onion Lake. Former agent, G. G. Mann, of the N.W.M.P. resigned February 1, 1900. A telephone line extends from the office, at Saddle Lake, to the Industrial School, 6½ miles. Special connection for Mounted Police. The office at Edmonton has been operated jointly with the C.P.R. Tel. Co. since January 1, 1892.
8	Bresaylor .....	27	{ D. Noel (agt. lineman) ..	480 00 Sept. 19, 1895.		
9	Pitt .....	62	{ J. T. Callahan .....	600 00 Oct. 1, 1898.		
10	Onion Lake .....	13	{ M. Thérien .....	600 00 Oct. 1, 1898.		
11	Moose .....	32½	{ L. Picard .....	360 00 Dec. 1, 1899.		The office at Edmonton has been operated jointly with the C.P.R. Tel. Co. since January 1, 1892.
12	St. Paul de Metis .....	32	{ J. C. Gordon .....	600 00 July 1, 1891.		
13	Saddle Lake .....	13	{ A. W. M. Campbell .....	600 00 April 1, 1899.		
14	Victoria .....	37	{ J. A. Macdonald .....	600 00 Oct. 1, 1898.		
15	{ Fort Saskatchewan .....	49	{ S. B. McNamara .....	120 00 May 1, 1899.		The St. Albert branch line is operated with telephones. It was leased to the Edmonton District Telephone Co., from October 24, 1895. Moosejaw office is operated jointly with the Canadian Pacific Telegraph Co. The allowance at Wood Mountain was lost \$180 per annum up to March 1, 1900.
16	{ .....	24	{ W. McKay, repairer .....	360 00 June 1, 1899.		
	Edmonton .....	24	{ .....	720 00 May 1, 1896.		
	Branch Line— Edmonton .....	0	{ .....	.....		
	St. Albert .....	9	{ .....	.....		
	<i>Wood Mountain Section.</i>					
1	Moosejaw .....	0	{ A. Wilcox, agent .....	240 00 Dec. 1, 1891.		The allowance at Wood Mountain was lost \$180 per annum up to March 1, 1900.
2	Wood Mountain .....	90½	{ H. Sikes, repairer .....	600 00 " 1, 1893.		
	.....		{ J. H. Thompson, agent ..	300 00 " 1, 1890.		
	Total .....	688		11,700 00		

## SESSIONAL PAPER No. 19

## GOVERNMENT TELEGRAPH SERVICE—Continued.

## GOVERNMENT TELEGRAPH SERVICE IN BRITISH COLUMBIA.

No.	Stations.	Inter- mediate Dis- tances.	Agents.	Salaries per Annum.	Date of Appointment.	Memo.
	<i>Ashcroft—Barkerville</i> †	Miles.		\$ cts.		
1	Ashcroft Station .....	0	Jas. Wilson (Kamloops), joint Dist. Supt. Govt. and C. P. lines .....	180 00 240 00	July 4, 1898.	Proportion of salary pertaining to this line; Proportion of salary pertaining to this line; the Ashcroft office is operated jointly with the C.P.R. Telegraph.
2	Clinton .....	30	A. LeBourdais, agt. & rep.	300 00	Feb. 16, 1883.	
3	Bridge Creek (115-Mile House) .....	53	J. D. McIntosh .....	720 00	Jan. 1, 1900.	
4	150-Mile House* .....	40	S. T. Hall, agt. & oper.	450 00	Nov. 1, 1893.	
5	Soda Creek .....	38	G. H. Smith, agt. & rep.	900 00	March 1, 1896.	*The testing office formerly at 134-Mile House was dis- continued in May, 1900.
6	Quesnelle .....	54½	J. E. Bowron, " "	564 00	Prior to 1891.	
7	Stanley .....	48	Accommodat'n com. office	1,000 00	Feb. 17, 1873.	
8	Barkerville .....	13	J. Stone, agt. & repairer.	4,000 00		
	Total.....	276½				
	<i>Ashcroft—Lillooet</i> †					
	Ashcroft Station .....	0	Jas. Wilson (Kamloops), joint Dist. Supt. Govt. and C. P. lines .....	120 00 240 00	July 4, 1898.	Proportion of salary pertaining to this line; Proportion of salary pertaining to this line; the Ashcroft office is operated jointly with the C.P.R. Telegraph.
1	Pavillion .....	40	Accommodat'n com office	.....	Dec. 1, 1890.	
2	Lillooet .....	22	S. A. Macfarlane, ag. & op.	720 00	Jan. 3, 1896.	
	Total.....	62		1,080 00		

## GOVERNMENT TELEGRAPH SERVICE.—Continued.

## GOVERNMENT TELEGRAPH SERVICE IN BRITISH COLUMBIA.—Continued.

No.	Stations.	Inter- mediate Distance	Agents.	Salaries per Annum.	Date of Appointment.	Memo.
	<i>Victoria—Cape Beale</i> †					
1	Victoria .....	0	Jas. Wilson (Kamloops), joint Dist. Supt. Govt. and C. P. lines.....	120 00	Nov. 1, 1891.	Proportion of salary pertaining to this line Proportion of salary.
2	Sooke .....	18	E. Houghton, operator ..	240 00	April 21, 1893.	
3	Otter Point .....	8	M. Milne, com. office.....	720 00	Dec. 1, 1891.	
4	Jordan River .....	10	E. Gordon, agt. & oper. ..	540 00	May 1, 1897.	†These three lines are operated by the Canadian Pacific Railway Co. for the Government, the arrangement being terminable at any time.
5	Port San Juan .....	30	J. Goudie, ..	720 00	July 1, 1900.	
			B.H. Kirkpatrick, ..	240 00	Nov. 1, 1891.	
6	Carmanah Lighthouse, (Close 2 miles west)....	24	W. P. Daykin, ..	540 00	April 1, 1898.	
			D. Logan, repairer .....	540 00	June 1, 1899.	
7	Cape Beale .....	28	J. Vanslyke, ..	120 00	Sept. 1, 1899.	
	Total .....	118		\$2,780 00		

Office.	Inter- mediate Distance	Agents, etc.	Positions.	Salaries per Annum.	Date of Appointment	Memo.
<i>Nanaimo-Comox.</i>						
1 Nanaimo .....	Miles. 0	{ W. F. Archibald Joint with C. P. R. ....	Agent and operator .....	\$ cts. 186 00	March 1, 1896	This payment—\$15.50 per month comprise \$10 for agency, \$3 for messenger service, and \$2.50 for care of main battery.
2 Wellington .....	5	{ E. & N. Ry. Co. ....	" .....	Commission .....	April 1, 1893	
3 Parksville .....	23	{ Mrs. R. Williams .....	Repairer .....	240 00	Dec. 1, 1897	
4 Fanny Bay .....	23	{ Geo. Williams .....	" .....	570 00	1, 1897	
5 Union Bay .....	9½	Thos. Hudson .....	" .....	780 00	Nov. 17, 1898	
6 Union Mines .....	10	E. McDonald .....	Agent and operator .....	390 00	June 3, 1898	
7 Cumberland .....	10	J. Dunsinuir .....	Accommodation officer .....			See mention of this in body of report (1897-98).
8 Courtney .....	7	Albert Peacy .....	Agent and operator .....	120 00	April 28, 1898	
9 Comox .....	3½	M. McDonald .....	Agent and operator .....	& comm. 25 p. c. .... 390 00	Nov. 1, 1895	Courtney and Fanny Bay are communicated with by tele- phone at pre-arranged in- tervals.
Total .....	81			& comm. 25 p. c. .... 2,616 00		
<i>Parksville- Cape Beale.</i>						
Parksville .....	0	(See above) .....				
1 Alberni .....	29½	{ C. T. Haslam .....	Agent and operator .....	720 00	June 27, 1895	NOTE.—The repairing of this Alberni-Cape Beale line neces- itates the use of a steamboat, and has been contracted for with Mr. G. A. Huff at \$75 per month covering all charges. to this line.
Alberni .....		{ P. A. Haslam .....	Assistant and operator .....	120 00	Oct 1, 1899	
		G. A. Huff .....	Con. Repairer .....	900 00	May 1, 1900	
2 Cape Beal .....	57	M. Patterson .....	Agent and operator .....	240 00	May 1, 1900	
Total .....	86½			1,980 00		

The above lines are operated by the Government through the office of the Resident Engineer at Victoria.

# GOVERNMENT TELEGRAPH SERVICE

BRITISH COLUMBIA.—Continued.

No.	Offices.	Inter- mediate Distance	Agents, &c.	Positions	Salaries per Annum.	Date of Appointment.	Memo.
	<i>Kamloops-Lower Nicola.</i>	Miles.			\$ cts.		
1	Kamloops .....	0	A. J. Venn (C. P. Tel.) ..	Agent ...	180 00	April 18, 1900. Connected.	NOTE.—This line is operated with tele- phones. The lessees pay a monthly rent for the connections, and are allowed 25 per cent commission on local tolls for messages and conversations of non sub- scribers.
2	Quilchena .....		E. O. Rourke .....	Lessee .....	25 p. c. Com.	May 1, 1900.	
3	Nicola Lake .....	54	A. R. Carrington .....	" .....	"	"	
4	" .....		A. E. House .....	" .....	"	"	
5	Lower Nicola .....	13	Geo. Armstrong .....	" .....	"	"	
	Total .....	67					

This line is operated under the superintendence of the Resident Engineer at Victoria.

## GOVERNMENT TELEGRAPH SERVICE.

## BENNETT—DAWSON—ATLIN LINE.

No.	Stations.	Inter- mediate Distance	Agents.	Salaries per Annum.	Date of Appointment.	Memo.
1	Bennett.....	0	M. W. Crean, Dist. Supt. F. W. Dowling, operator N. Bellefeuille, head U'man. H. Gagné, lineman..... E. M. Stikley, operator.. R. M. Grimes, operator.. E. S. Chambers, lineman.. Ignace Hébert, lineman..	165 66 per month. 125 00 " " 150 00 " " 3 00 " day 100 00 " month 3 00 " day 3 00 " "	April, 1899 April, 1, 1900 Sept. 29, 1899 Oct. 1, 1899 Sept. 28, 1899 Sept. 28, 1899 Oct. 1, 1899 Nov. 1, 1899	
2	Carlou Crossing.....	28	G. S. Flemming, operator	125 00 " month	Sept. 28, 1899	
3	Tagish .....	18	F. Dixon, lineman..... T. Phalen, operator..... J. H. Brown, lineman..... F. R. Walker, operator.. G. A. McLachlan, oper.. J. C. Kirk, lineman..... W. R. Holden, operator.. H. Savagau, lineman..... G. Hutchinson, operator.. H. D. Card, lineman..... J. Brownlow, operator.. R. C. McDonald, lineman W. A. Moore, operator.. E. F. Millar, lineman...	3 00 " day 100 00 " month 3 00 " day 100 00 " month 100 00 " " 3 00 " day 100 00 " month 3 00 " day 110 00 " month 3 00 " day 100 00 " month 3 00 " day 100 00 " month 100 00 " day 3 00 " day 3 00 per day	Sept. 28, 1899 Oct. 1, 1899 Sept. 28, 1899 Oct. 1, 1899 Sept. 28, 1899 Sept. 28, 1899 Oct. 1, 1899 Sept. 28, 1899 Oct. 1, 1899 Sept. 28, 1899 Oct. 1, 1899 Oct. 1, 1899 Dec. 18, 1899 Feby. 19, 1900	Summer office closed Nov. 13th 1899.
4	Miles Canyon.....	64				
5	White Horse .....	5				
6	Lower Lebarge .....	59				
7	Hootalingqua .....	30				
8	Big Salmon. ....	34				
9	Five Fingers.....	96				
10	Fort Selkirk.....	58				
11	Selwyn.....	30				
12	Stewart River .....	75				

## GOVERNMENT TELEGRAPH SERVICE.—Continued.

## BENNETT—DAWSON—ATLIN LINE.—Continued.

No.	Stations.	Inter- mediate Distance	Agents.	Salaries per Annum.	Date of Appointment.	Memo.
13	Ogilvie.....	23	J. W. Wilkinson, operator	100 00 per month	Sept. 28, 1899	
14	Dawson.....	48	Archie Johnson, lineman, A. B. Clegg, manager..... D. S. McKenzie, operator..... Percy Overton, mess., etc., C. A. Couture, head l'man W. A. McNamara, lineman	3 00 " day 125 00 " month 125 00 " " 90 00 " " 150 00 " " 100 00 " "	Dec. 7, 1899 Sept. 10, 1899 Sept. 18, 1899 Nov. 17, 1899 Sept. 28, 1899 Oct. 1, 1899	
	<i>Branch.</i>	564				
15	{ Tagish..... { Atlin.....	75	A. H. Mansfield, operator { J. Huston, lineman..... { F. Mulligan.....	125 00 " " 3 50 " day 3 50 " day	Oct. 1, 1899 Oct. 1, 1899 Oct. 1, 1899	
		639		42 400 00		



## GOVERNMENT TELEGRAPH LINES.

## SPECIAL TARIFF.

*Cable messages.*—Rates for cable messages and for press reports, passing over the Yukon line will be found in connection with other British Columbia lines in the following pages.

Elsewhere, the rate for transatlantic messages passing over the government lines is the same as for ordinary through messages, excepting where the ordinary tariff is more than 25 cents; in such cases the government line rate is 4 cents per word, with a minimum charge of 25 cents. For example :—

For a message of six words or less the charge is 25 cents for government line.

For a message of seven words the charge is (7 x 4c.) 28 cents for government line.

For a message of twelve words the charge is (12 x 4c.) 48 cents for government lines.

In every case the counting of words includes the address and signature in the same way as for transatlantic cable toll.

*Press despatches.*—The rate for press despatches on the government lines (excepting the Yukon line), formerly a quarter cent per word, has been changed to 20 cent pas 100 words; no single message less than 20 cents.

## REGULAR TARIFF—NOVA SCOTIA.

*Line from North Sydney to Meat Cove and Mabou—Local rate 25-1 \* (13 offices).*

Big Bras d'Or.....Through rate 15-1 from North Sydney, W. U. office.  
New Campbellton (Kelly's

Cove).....	"	"	"
Port Bevis.....	"	"	"
Englishtown.....	"	"	"
Baddeck.....	"	"	"
St. Anne, South Gut.....	"	"	"
French River.....	"	"	"
South Ingonish.....	"	"	"
Ingonish.....	"	"	"
Neil's Harbour.....	"	"	"
White Point.....	"	"	"
Aspy Bay.....	"	"	"
Meat Cove.....	"	"	"
Pleasant Bay.....	"	"	"
Cheticamp.....	"	"	"
Grand Etang.....	"	"	"
North East Margaree.....	"	"	"
Margaree Harbour.....	"	"	"
South West Margaree.....	"	"	"
Broad Cove.....	"	"	"
Mabou.....	"	"	"

*Line from Barrington to Cape Sable—Local rate 12-1 (2 offices).*

Newellton.....Through rate 12-1 from Barrington, W. U. office.  
Cape Sable lighthouse....."

\* N.B.—When the tariff rate is entered as 25-1 or 50-2, etc., the meaning is that the rate is 25 cents or 50 cents for ten words and 1 cent or 2 cents for each additional word.

## NEW BRUNSWICK.

*Line from Chatham to Point Escuminac—Local rate 25-1 (4 offices).*

Bay du Vin.....	Through rate 15-1 from Chatham, G. N. W. office.		
Lower Hardwicke.....	"	"	"
Escuminac .....	"	"	"
Pt. Escuminac Lt. House....	"	"	"

*Line from Eastport, Me., to Campobello, Grand Manan, and Whitehead Islands (9 offices)—Local rates between offices on Grand Manan, and Whitehead Islands 15-1; Grand Manan and Campobello Island 25-2; The Islands and Eastport, Me. 25-2. W. U. O.*

Welchpool, Campobello.....	Through rate 25-2 from Eastport, Me., W. U. office.		
Flaggs Cove, Grand Manan...	"	"	"
Castalia.....	"	"	"
Woodward's Cove.....	"	"	"
Graud Harbour.....	"	"	"
Seal Cove.....	"	"	"
Southern Head.....	"	"	"
Cheney's Island.....	"	"	"
Whitehead Islands.....	"	"	"

## QUEBEC.

*Line from Gaspé to Anticosti Island, Q. (9 offices)—Local rates between offices on the Island 25-1; Gaspé and the Island offices 50-2.*

South West Point.....	Through rate 50-2 from Gaspé G. N. W. office.		
Salt Lake.....	"	"	"
Shallop Creek.....	"	"	"
South Point.....	"	"	"
Heath Point.....	"	"	"
Fox Bay.....	"	"	"
Becsie River.....	"	"	"
West Point.....	"	"	"
English Bay.....	"	"	"

*Line from Meat Cove, C. B., N. S., to Magdalen Islands, Q. (8 offices) Local rates between offices on the Islands 25-1; Meat Cove and the Islands 50-2; offices on the Meat Cove line and the Islands 50-2.*

Amherst Island .....	Through rate 50-2 from N. S., W. U. office.		
Amherst Lt. House.....	"	"	"
Etang du Nord Village.....	"	"	"
Etang du Nord Lt. House...	"	"	"
Capaux Meules (Grindstone)	"	"	"
House Harbour.....	"	"	"
Grosse Isle.....	"	"	"
Grand Entry.....	"	"	"

*Line from Meat Cove C.B., N. S., to St. Paul's Island.—Local rate between offices on Meat Cove line and St. Paul's 50-2 (1 office).*

St. Paul's Island Lt. House	50-2 from North Sydney, N.S., W. U. office.
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*Line from Quebec to Grosse Isle Quarantine Station (7 offices)—Local rates between offices on Orleans Island and Isle Réaux 15-1 ; on Orleans Island, Isle Réaux and Quebec 15-1 ; on Orleans Island and Grosse Isle 25-1 ; on Isle Réaux and Grosse Isle 15-1.*

St. Pierre, Orleans Island....	Through rate 15-1 from Quebec, G. N. W. Office.		
Ste. Pétronille.....	"	"	"
St. Laurent.....	"	"	"
St. Jean.....	"	"	"
St. François.....	"	"	"
Isle Réaux.....	"	"	"
Grosse Isle.....	"	25-1	"

*Line from Baie St. Paul to Chicoutimi (6 offices).*

For business with offices west of Baie St. Paul, and terminating at Quebec, add 15c. and 1c. to the Government line tariff.

For business with offices west of Baie St. Paul, beyond Quebec, add the full rate of the Great North-Western Telegraph Company to the Government line tariff.

*Line from Murray Bay to Baie des Moutons (13 offices) with branch to Anticosti.*

For business with offices west of Murray Bay and terminating at Quebec, add 15c. and 1c. to the Government line tariff.

For business with offices west of Murray Bay beyond Quebec, add the full rate of the Great North-Western Telegraph Company to the Government line tariff.

*Local rates between offices not more than 100 miles apart 15-1 , more than 100 miles apart 25-1 ; on mainland and Anticosti 50-2.*

St. Urbain.....	15-1 from Baie St. Paul (Ck. Que.) G. N. W. office.		
Lacruche.....	"	"	"
St. Alexis.....	"	"	"
L'Anse St. Jean.....	"	"	"
St. Alphonse de Bagotville...	"	"	"
Chicoutimi.....	"	"	"
Cap à l'Aigle.....	15-1 from Murray Bay (Ck. Que.) G. N. W. office.		
Ste. Fidèle.....	"	"	"
Port au Persil.....	"	"	"
St. Siméon.....	"	"	"
Baie des Rochers.....	"	"	"
Rivière aux Canards.....	"	"	"
St. Etienne.....	"	"	"
Tadoussac.....	"	"	"
Bergeronnes.....	"	"	"
Escoumains.....	"	"	"
Baie des Bacons.....	"	"	"
Mille Vaches.....	25-1	"	"
Portneuf Mills.....	"	"	"
Portneuf Light....	"	"	"
Sault au Cochon.....	"	"	"
Betsiamis ( Bersimis).....	"	"	"
Manicouagan (Pt. Outardes).	"	"	"
River Godbout.....	"	"	"
Pointe des Monts.....	"	"	"

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Trinity Bay, West.....	25-1	from Murray Bay (Ch. Que.)	G.N.W. Office.
Trinity Bay, East.....	"	"	"
Caribou Islands.....	"	"	"
English Point.....	"	"	"
Pentecost .....	"	"	"
Ste. Marguerite.....	"	"	"
Seven Islands.....	"	"	"
River Moisie.....	"	"	"
Sheldrake .....	"	"	"
Thunder River.....	"	"	"
Magpie.....	"	"	"
St. John River.....	"	"	"
Long Point.....	"	"	"
Mingan ..	"	"	"
Point Esquimaux.....	"	"	"
Piastre Bay.....	"	"	"
Aguanus .....	"	"	"
Natashquan .....	"	"	"
Big Romaine.....	"	"	"
Pointe du Maurier.....	"	"	"
Baie des Moutons.....	"	"	"
Anticosti Id. via Long Point.....	50-2	"	"

## ONTARIO.

*Line from Leamington to Pelee Island (Telephone Circuit) — Local rates between Leamington and Point Pelee 15-1 ; mainland and Island Offices 25-1 ; Offices on the Island 15-1 (8 offices).*

Gun Club House, mainland.....	15-1	(thro' business) from Leamington, G. N. W.
Pointe Pelee, mainland.....	"	"
Leamington Dock.....	"	"
North Pt. Lt. H'se Pelee Island	"	"
North Dock, Pelee Island ....	"	"
McIntyre's Corners.....	"	"
West Dock, Pelee Island.....	"	"
South Dock.....	"	"

## NORTH-WEST TERRITORY.

*Line from Qu'Appelle (C. P. R. Sta.) to Edmonton, Alberta — Local rates, 15-1, 25-2 and 50-3 for distances 10 to 600 miles, (13 offices).*

Fort Qu'Appelle.....	25-2	Qu'Appelle or Saskatoon.
Touchwood.....	"	"
Saskatoon (Ts. office C.P.R. Tel.)	"	"
Henrietta.....	"	"
Battleford.....	"	"
Bressaylor.....	25-2	Saskatoon ; 50-3 Qu'Appelle or Edmonton.
Onion Lake.....	"	"
Moose.....	"	"
St. Paul de Métis.....	50-3	Saskatoon, Qu'Appelle or Edmonton.
Saddle Lake.....	"	"
Victoria.....	25-2	Edmonton ; 50-3 Qu'Appelle or Saskatoon.
Fort Saskatchewan.....	"	"
Edmonton (Ts. office CPR Tel)	"	"

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*Line from Moosejaw (C.P.R. Stn.) to Wood Mountain—Local rates 25-2 (1 office)*  
 Wood Mountain.....25.2 from Moosejaw.

## BRITISH COLUMBIA.

*Line from Ashcroft (C.P.R. Stn.) to Barkerville—Local rates 25, 50, 75 (9 offices)*

Clinton.....	25-2	from Ashcroft C. P. R. Tel. office.	
Bridge Creek.....		"	"
150-Mile House.....	50-3	"	"
Soda Creek.....		"	"
Quesnelle.....		"	"
Stanley.....	75-5	"	"
Barkerville.....	75-5	"	"
Lillooet (branch).....	50-3	"	"
Pavillion (on Lillooet branch).....		"	"

*Line from Victoria to Cape Beale—Local rate 50-3 (6 offices)*

Sooke.....	50-3	from Victoria C. P. R. Tel. office.	
Otter Point.....		"	"
Jordan River.....		"	"
Port San Juan.....		"	"
Carmanah Lt. House.....		"	"
Cape Beale.....		"	"

*Line from Nanaimo to Comox—Local rate 25-2 (9 offices)*

Wellington (C.P.R. & E. & N. Ry.).....	25-2	from Nanaimo.	
Parksville.....		" or Wellington.	
Fanny Bay.....		"	"
Cumberland.....		"	"
Union Bay.....		"	"
Union Mines.....		"	"
Courtney.....		"	"
Comox.....		"	"
Alberni (branch).....		"	"

*Line from Alberni to Cape Beale—Local rate 50-3.*

Between offices on the Victoria-Cape Beale line and the Nanaimo-Comox line, via Alberni, 50-3.

*Line from Bennett to Dawson and branch Tagish to Atlin (12 offices)*

This line connects at Bennett with the White Pass Railway Telegraph which terminates at Skagway; the system being isolated is reached by transports from Vancouver or Victoria. The tariff rates are as hereunder :

*Cable messages* (transatlantic).—33c. per word from or to Victoria, of this 8c. is for the White Pass Company's line and 25c. for the Government line, charges defrayed from the latter for carriage of messages between Victoria and Skagway.

*Press rate.*—4c. per word from Victoria ; of this 1c. is for the White Pass Company's line, and 3c. for the Government line, charges defrayed from the latter for carriage of despatches between Victoria and Skagway. Minimum charge for despatch, \$2.50 ; of this 75c. is for the White Pass Company's line, and \$1.75 for

the Government line, the latter including carriage charges as above. This press rate, while local, applies to press despatches handled as such at special rates by connecting lines and cables.

*Ordinary message rates*—75c., and 5c. for White Pass Company line, and 50c and 5c. to \$3.00 and 15c. according to distance, for Government line : the charge being approximately 50c for 10 words for each 100 miles.

Cariboo Crossing .....	50 and	5	from Bennett.
Tagish .....	60 and	5	"
Miles Canyon.....	75 and	5	"
White Horse.....	75 and	5	"
Lower Laberge.....	100 and	10	"
Hootalinquia.....	125 and	10	"
Five Fingers.....	200 and	15	"
Fort Selkirk.....	250 and	15	"
Stewart River.....	275 and	15	"
Dawson .....	300 and	15	"
Atlin (branch).....	75 and	5	"

Offices on Government lines as listed.....	168
Offices at transfer points with connecting lines.....	17

Total number embraced by the service.... 185

PART VI

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Report of the Collector of Revenue

DEPARTMENT OF PUBLIC WORKS

1899-1900.





## COLLECTION OF REVENUE.

## DEPARTMENT OF PUBLIC WORKS.

OTTAWA, 30th November 1900.

JOS. R. ROY, Esq.,

Acting Secretary Department of Public Works.

SIR,—I have the honor of submitting my report for the year ended 30th, June 1900.

I have examined the books and accounts of all the officers under my control, (excepting those of the Dock Master at Esquimalt) and it is my pleasing duty to state that, in all cases, the rules laid down for their guidance by the department have been carefully complied with by these officers; who have faithfully accounted for all the revenue collected by them.

Again, this year, I very much regret having to report that the revenue shows a falling off compared with that of the preceding fiscal year. Being only \$79,081.47 in 1899-1900 or \$13,283.56 less than in 1898-1899 when it was \$92,365.03.

With regard to this shortage it is but fair to note that the revenue from dry docks was \$10,117.85 less than in 1898-1899. As the income from this source is dependent on accidental injury to vessels and is consequently of a very precarious nature, it follows that this decrease is in no way attributable to the department or any of its officers.

The revenue from slides and booms also shows a deficiency of \$3,236.24 compared with the previous year.

Here, again, it is but just to state that the revenue from the Ottawa district exceeded that of 1898-99, by \$1,437.90 but that from the St. Maurice district was less by \$4,674.14 which loss is attributable largely to the disaster that befell the works on the 27th and 28th September 1899, whereby an immense number of saw-logs escaped into the St. Lawrence, the tolls on which were consequently lost.

The revenue from locks shews a net increase of \$70.53 notwithstanding the fact that the Yamaska lock yielded less by \$52.55 than in 1898-99.

Having dealt in a general way with the Revenue, I beg to submit the particulars in detail relating to the various services under their respective heads.

## SLIDES AND BOOMS.

## OTTAWA DISTRICT.

The tolls charged up during the fiscal year amounted to \$40,256.88, being \$1,437.90 more than for 1898-99.

The number of saw-logs which passed through the works was 3,086,879 pieces or 136,318 ps. more than during the previous year.

Of square timber there were only 9,809 pieces or 15,976 pieces less than the preceding year.

All the revenue derived from this district for 1899-1900, was collected during the financial year.

Of the dues accrued since 1st July 1889, there remains uncollected \$7,507.98 full particulars of which appear in statement No. 2 herewith.

Of dues accrued prior to 1st July 1889, \$56,805.65, are uncollected and should be written off. See statement Nos. 1 and 3 for particulars.

The account for the Ottawa district stand thus :—

Dues accrued during the year 1899-1900.....\$ 40,256 88

All collected during the year.

The amount outstanding uncollected remains the same as on 30th June 1899, thus :—

Dues accrued prior to the collection being transferred to this department 1st July, 1889.....	\$ 56,805 65	
Dues of 1889-90.....	\$ 6,903 05	
“ “ 1890-91.....	28 42	
“ “ 1892-93.....	379 80	
“ “ 1896-97.....	196 71	7,507 98

I beg leave to emphasize the fact that since this department assumed control of the collection of these dues, 1st July 1889. Of the revenue accrued say \$626,074.48 exclusive of \$6,903.05, Chaudiere boomage which should not have been charged up, only \$28.42 of absolutely established charges is uncollected.

The remainder ought to be written off, excepting perhaps the last item, that of 1896-97, which probably should meet with the same treatment.

Herewith are statements in detail :—

No. 1.—Statement of amounts outstanding prior to 1st July 1889, uncollected 30th September 1900.

No. 2.—Statement of amounts accrued at Ottawa since 1st July 1889, uncollected 30th September 1900.

No. 3.—Statement of amounts accrued at Quebec prior to 1st July 1889, uncollected 30th September 1900.

No. 4. Statement of the number of pieces of square timber, saw-logs &c., which passed through the Ottawa works during the year ended 30th June 1900.

No. 5.—Statement of dues accrued from each of the slides and works in the Ottawa district during the year ended 30th June 1900.

Reference to statement No. 5 shews a decrease again in the income from the Madawaska River which formerly was one of our best revenue producing rivers.

Last year I drew attention to the fact that the dues received from this source were only \$5,792.92 or \$4,232 65 less than in 1897-98, and this year the revenue was only \$3,399.25 or \$6,626.32 less than in 1897-98 and \$2,393.67 less than 1898-99.

As stated in my report of last year this river is practically worked out as to the pine timber, excepting part of the territory held by Mr. J. R. Booth and the St. Anthony Lumber Company, the latter having a saw-mill above our works and Mr. Booth conveying the timber by rail directly from the limits to his mill at Ottawa none of their logs pay us any toll, where formerly all the timber made on this river paid us more or less dues.

Hence the only revenue we can expect in future from the Madawaska will be that on Cedars, R. R. Ties, Pulp Wood, etc., which being of small value the rates are correspondingly low in comparison with those on pine timber and saw-logs.

I am glad to say that the revenue from the river Petewawe, which last year shewed a falling off of \$13,809.17 compared with 1897-98 : this year is better by \$2,333.31 than in 1898-99.

The steady decline in the production of square timber is a considerable factor in the reduction of the revenue from the Ottawa district and for the current year (1900-01), the income from this source is practically Nil. However, from the reports I have, I anticipate a considerable revenue from this trade next year.

## SESSIONAL PAPER No. 19

For the first time since the tariff now in force was adopted, has the average annual revenue fallen below the estimate on which it was based.

The average yearly revenue expected was \$49,000.00, owing to reduced income of 1898-99 and 1899-1900, the average has dropped to \$48,822.29 or \$177.71 less than the estimate

There is however every indication that the revenue for the current year will approach more nearly to the estimate and I hope, with the increase in the square timber business, that the revenue will, next year, again touch the estimated figure.

In conclusion I would respectfully point out the desirability of bringing the question of the uncollected arrears, not only those of the Ottawa district but also those of the other districts, before the Public Accounts Committee so as to have the authority of Parliament to write them off.

## ST. MAURICE DISTRICT.

The revenue from this district was only \$16,712.45 being \$4,674.14 less than for the year 1898-99.

All the dues of 1899-1900, were collected during the fiscal year.

There is no change to note in regard to the amount outstanding on the 1st July 1899, namely, \$14,481.49, all of which had accrued before I took charge in 1892, and which should all be written off for reasons ascribed in Statement No. 6 herewith.

The decrease in revenue from this district is mainly due to the accident which occurred to the works caused by the flood on the 27th and 28th September 1899, whereby almost all the booms on the river from Shawenigan to the mouth of the St. Maurice were either broken or torn away from their moorings.

The large boom near the railway bridge at Three Rivers contained about 160,000 logs of which a considerable portion was caught at the safety boom at the mouth, and from the best information obtainable I am of opinion that from 25,000 to 35,000 logs were totally lost to the lumbermen, the remainder being either caught in the safety boom or picked up along the St. Lawrence, some as far down as Quebec.

The prospects for a large increase in the revenue during the coming year are very bright; as the new pulp mill of the Franco-Belgian Company now being erected at Shawenigan will require at least 350,000 logs annually and while, this year, the Laurentide Pulp Company, notwithstanding the fact that an important part of their plant was destroyed by fire early in the spring, have used over 700,000 logs, I am informed that to keep their mills, now restored, running to their full capacity it will require over 1,000,000 logs yearly. These with the other operators getting out a much larger number of logs than last year should bring the revenue up to at least a satisfactory figure in 1901-02.

There is every indication that in the near future, in consequence of the development of the vast water powers of the St. Maurice and the demand for spruce pulp, the returns from it will amply compensate the government for the large outlay incurred just now to provide safe accommodation for the timber to be brought down.

## NEWCASTLE DISTRICT.

The accompanying statement No. 7 contains the particulars of the dues uncollected amounting to \$6,058.34 of which \$3,521.19 should be written off in accordance with a decision of the Exchequer Court.

I would again urge the desirability of a settlement being arrived at of the dispute involving the remainder of the amount uncollected, namely, \$2,537.15 so

that accounts of the past seven years might be adjusted and such dues as may be found to be owing collected.

### GRAVING DOCKS.

#### ESQUIMALT GRAVING DOCK.

The revenue from this source, shewn in detail in statement No. 8 herewith, was \$6,659.94 being \$3,655.69 less than in 1898-99.

The dock was occupied for 107 days or 27 days less than during the previous year.

Of the 107 days the dock was occupied, it was used by vessels of war 90 days, Canadian Government vessels 8 days and private vessels 9 days.

Inasmuch as it was found that the reduction of the charges in May 1899 did not attract vessels to the dock but only had the effect of cheapening the dues on such vessels as were obliged to use the dock, the old tariff was reverted to by Order in Council of 5th June 1900.

#### LEVIS GRAVING DOCK.

The revenue has again fallen off \$3,069.41 compared with that of 1898-99, being only \$10,716.68. See statement No. 9 herewith.

The dock was occupied but 84 days, exclusive of winter months,—during 1898-99, it was in use for 104 days.

During the winter of 1899-1900, the dock was occupied by the Government Steamer Eureka; but as no other request for the dock had been received, no charge was made against this vessel.

#### KINGSTON GRAVING DOCK.

The income from this dock was only \$4,114.13 being \$3,392.75 less than for 1898-99. See statement No. 10.

It was occupied for 72½ days during the last year, while in 1898-99 it was in use for 93 days of the season of navigation.

From 1st January to 17th April 1900 it was idle, but it was occupied for 61 days of the preceding winter.

By Order in Council of 20th February 1900 the regulations were revised and amended, mainly in regard to permitting a half day charge, which it is expected will bring in some revenue that would otherwise be lost, of course there is no charge for less than one full day,—the half day rate applying only to vessels which have been already at least one full day in the dock.

The most important amendment is that defining when the winter rates begin and end,—formerly these began on the 1st December and ended on 15th April,—these dates have been changed to 31st December and 1st April. This amendment was provided in order to prevent the abuse which prevailed of getting the dock at winter rates, \$10.00 per day, and using it for only a part of the month of December and in the same way the dock has been engaged at winter rates from 1st to 15th April and as many as nine (9) different vessels docked and repaired in it, which under the new regulations would pay full summer rates.

## LOCKS.

## RIVIERE DU LIEVRE

The tolls collected amounted to \$296.80 being \$123.08 more than in 1898-99.

## RIVIERE YAMASKA.

The Revenue from this work was \$52.55 less than that of the previous year, being only \$324.59.

Thus the total collections which passed through my hands during the year ended 30th June 1900 may be summarized as follows :

From slides and booms.....	\$56,969	33
“    graving docks.....	21,490	75
“    locks.....	621	39
	<hr/>	<hr/>
	79,081	47

The following comparative statement of Public Works Revenue collected 1898-99 and 1899-1900, shows at a glance where the decreases have occurred :—

	Year 1899-1900.	Year 1898-1899.	Increase 1899-1900.	Decrease 1899-1900.
<i>Slides and Booms.</i>				
Ottawa District .....	40,256 88	38,818 98	1,437 90	.....
St. Maurice District.....	16,712 45	21,386 59	.....	4,674 14
	<hr/>	<hr/>	<hr/>	<hr/>
	56,969 33	60,205 57	1,437 90	4,674 14
Net decrease .....	.....	.....	.....	3,236 24
<i>Graving Docks.</i>				
Esquimalt .....	6,659 94	10,315 63	.....	3,655 69
Levis.....	10,716 68	13,786 09	.....	3,069 41
Kingston.....	4,114 13	7,506 88	.....	3,392 75
	<hr/>	<hr/>	<hr/>	<hr/>
	21,490 75	31,608 60	.....	10,117 85
<i>Locks.</i>				
Rivière du Lièvre.....	296 80	173 72	123 08	.....
Rivière Yamaska.....	324 59	377 14	.....	52 55
	<hr/>	<hr/>	<hr/>	<hr/>
	621 39	550 86	123 08	52 55
Net Increase .....	.....	.....	.....	70 53

Total Decrease Year ended 30th June 1900, \$13,283.56

In conclusion I have to acknowledge the uniform courtesy and cheerful assistance accorded me, at all times by the officers with whom I have been brought in contact during the year.

I have the honour to be, respectfully, sir,

Your very obedient servant,

EDWARD T. SMITH,

Collector of Public Works Revenue.

No. 1.—Statement of Slideage and Boomage from the Ottawa Slides and Works, accrued prior to 1st July 1889, Outstanding 30th June 1900, and remaining uncollected on 30th September 1900.

By Whom Due.	Bad and Doubtful Debits.	Chaudre Boonage in Suspense.	Other Slide and Boom Dues Disputed.	Total Outstanding on Sept. 30, 1900.	Year to which Dues belong.	Remarks.
John and Wm. McLean.....	53 11	..	..	53 11	1873	Insolvent.
John Rowan.....	242 50	..	..	242 50	1873-1875	..
Lemieux & Charette.....	21 30	..	..	21 30	1873	..
Mallon & Lapierre.....	148 10	..	..	148 10	1873-1874	..
W. C. Wells.....	20 00	..	..	20 00	1873-1874	..
Dufresne & McGarity.....	528 80	..	..	528 80	1874-1875	..
John Smith.....	171 40	..	..	171 40	1874-1875	..
A. B. Bales.....	3,207 02	..	..	3,207 02	1874-1875	..
Hon. James Skead.....	9,807 05	..	..	9,807 05	1801-1882, 1894, 1899, 1875 to 1880	..
Batson & Currier.....	5,558 70	..	..	5,558 70	1875 to 1877	..
A. F. A. Kuegler.....	540 30	..	..	540 30	1878	..
James Walker.....	11 25	..	..	11 25	1877	..
James G. Bryson.....	1,325 00	..	..	1,325 00	1881	..
Costello Bros.....	90 02	..	..	90 02	1882	..
S. R. Conner.....	428 34	..	..	428 34	1888	..
J. & B. Grier.....	75 84	..	..	75 84	1893	..
R. & W. Conroy.....	105 42	..	..	105 42	1892-1893	..
R. Caldwell & Son.....	1 33	..	..	1 33	1881	..
J. R. Booth.....	9,871 93	..	..	9,871 93	1881 to 1888	..
Derley & Pattee.....	8,889 85	..	..	8,889 85	1881 to 1888	..
Thos. Gossens & Weston Lumb, Co., .....	8,180 79	..	..	8,180 79	1881 to 1888	..
					Overcharge.	Reported in return S.—28 for March, 1886.
						*\$288.88 counter claim for damages by the breaking of Conlonge Boom.

\*Chaudière Boatage.—These parties claim that they have maintained these works wholly at their own expense since 1881.

Counter claim for damages by breaking of Coulonge works.

Pierce & Co.	402 18	1888.	402 18	1888.	402 18
G. A. Greer & Co.	1,000 30	1884-1885	1,000 30	1884-1885	1,000 30
Edw. J. LeV Young	413 87	1881 to 1888	413 87	1881 to 1888	413 87
W. J. Young	413 87	1881 to 1888	413 87	1881 to 1888	413 87
Gilhoon & Co.	406 27	1881	406 27	1881	406 27
John Rochester	258 88	1881 to 1885	258 88	1881 to 1885	258 88
J. & G. Bryson	252 20	1881	252 20	1881	252 20
	23,457 28		23,457 28		23,457 28
	31,003 54		31,003 54		31,003 54
	651 08		651 08		651 08
	35,653 90		35,653 90		35,653 90

EDWARD T. SMITH,  
*Collector of State and Boom Dues.*

DEPARTMENT OF PUBLIC WORKS.  
OTTAWA, 30 September, 1900.

By Whom Due.	Bad and Doubtful Debts.	Chaudière Boomage in Suspence.	Other Slide and Boom Dues Disputed.	Total Outstanding on Sept. 30, 1900.	Year to which Dues belong.	Remarks.
	\$ cts.	% cts.	% cts.	% cts.		
John and Wm. McLean.....	53 14			53 14	1873.....	Insolvent.
John Rowan.....	342 50			342 50	1872-1873.....	"
Lemieux & Charette.....	21 30			21 30	1873.....	"
Tailon & Lapiere.....	148 10			148 10	1873-1874.....	"
Mosgrove & McHarry.....	261 42			261 42	1873-1874.....	"
W. C. Wells.....	600 90			600 90	1873-1874.....	"
Dufresne & McGarity.....	528 80			528 80	1874-1875.....	"
Walton Smith.....	171 46			171 46	1874-1875.....	"
A. H. Baldwin.....	3,507 92			3,507 92	1871 to 1874.....	"
Hon. James Skead.....	9,807 65			9,807 65	1861, 1863, 1864, 1869, 1875 to 1878.....	"
Batson & Currier.....	5,558 70			5,558 70	1875 to 1877.....	"
A. F. A. Knight.....	546 30			546 30	1878.....	"
James Walker.....	11 25			11 25	1877.....	"
R. Campbell & Son.....	1,558 50			1,558 50	1879 to 1881.....	"
James G. Bryson.....	73 50			73 50	1880.....	"
Costello Bros.....	90 62			90 62	1882.....	"
N. E. Cormier.....	428 34			428 34	1888.....	"
James Vuill.....	9 29			9 29	1876.....	Overcharge.
J. & B. Grier.....	76 84			76 84	1883.....	"
R. & W. Conroy.....	95 42			95 42	1882-1883.....	"
A. & P. White.....	101 00			101 00	1881.....	"
B. Caldwell & Son.....	4 33			4 33	1887.....	"
J. R. Booth.....	9,871 93			10,270 81	1881 to 1888.....	"
Perley & Pattee.....	8,889 85			8,889 85	1881 to 1888.....	"
The Bronsons & Weston Lumb. Co.....	8,180 79			8,180 79	1881 to 1888.....	"

Reported in return S — 38 for March, 1886.

\*\$298.88 counter claim for damages by the breaking of Coulouge Boom



## SESSIONAL PAPER No. 19

\*Chaudière Booming—These parties claim that they have maintained these works wholly at their own expense since 1881.

Counter claim for damages by breaking of Coulonge works.

	1888.....	1889.....	1890.....	1891.....	1892.....	1893.....	1894.....	1895.....	1896.....	1897.....	1898.....	1899.....	1900.....
Pierce & Co.....	402 18	1,000 50	1,461 20	413 85	406 27	258 88	.....	252 20	.....	.....	.....	.....	.....
G. A. Grier & Co.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Estate late Levi Young.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Wm. Mason.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gilmour & Co.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
John Rochester.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
J. & G. Bryson.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	23,977 28	31,005 54	651 08	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

EDWARD T. SMITH,

*Collector of Slide and Boom Dues.*

DEPARTMENT OF PUBLIC WORKS,

OTTAWA, 30 September, 1900.

No. 2. STATEMENT of Slide and Boom Dues accrued from the Ottawa River Works since 1st July, 1889, outstanding on 30th September, 1900.

Name.	Year to which dues belong.	Chaudière Boomage in suspense.	Ordinary Dues.	Total Outstanding	Remarks
J. R. Booth.....	1880-80	\$ cts. 2,561 69	\$ cts. ....	\$ cts. 2,561 69	Chaudière Boomage reported to Council and referred to the Treasury Board, should be written off.
The Bronsons & Weston L. Co.....	"	2,056 96	.....	2,056 96	
Perley & Pattee.....	"	1,283 26	.....	1,283 26	
Wm. Mason & Sons.....	"	167 66	.....	167 66	
Pierce & Co.....	"	913 48	.....	913 48	Legal action taken to recover this. Retained by Mr. Booth in settlement of an account due him, which the Auditor General refuses to pay, as Mr. Booth appeared to be in arrears in this and Statement No. 1.
Alex. Fraser, act. Thos. Stephens.....	1890-91	.....	28 42	28 42	
J. R. Booth.....	1892-93	.....	379 80	379 80	
Bryson & Fraser.....	1896	.....	196 71	196 71	Have counter claim for work done on slide to this amount.
		\$ cts. 86,903 05	\$ cts. 604 93	\$ cts. 7,507 98	

EDWARD T. SMITH,

*Collector of Slide and Boom Dues*

DEPARTMENT OF PUBLIC WORKS.

OTTAWA, 30th September, 1900

No. 3.—STATEMENT of Outstanding Slide Dues, Ottawa District, Bonds for which were sent to Quebec for collection.

Name.	From 1860.	From 1861.	Total.
	\$ cts.	\$ cts.	\$ cts.
Hon. James Skead .....	245 00	210 00	455 00
James Mair.....	.....	696 75	696 75
	245 00	906 75	1,151 75

These amounts were uncollected, as the parties claimed damages for loss caused by the Madawaska Boom breaking away in 1860.

A decision on their claims was not arrived at till 2nd August 1869. On the 5th idem, Messrs. Skead and Mair were notified that the Department could not recognize their claim.

To the best of my knowledge, this decision was never communicated to the Collector of Slide Dues, consequently these accounts remained in abeyance.

Since then both parties died, and I believe both were insolvent at the time of their death.

EDWARD T. SMITH,

*Collector of Slide and Boom Dues.*

DEPARTMENT OF PUBLIC WORKS,  
 Ottawa, 30th September 1900.

No. 4.—STATEMENT of the number of pieces of Square Timber, Sawlogs, &c., that passed through the Government Slides and Works on the River Ottawa and its tributaries during the Fiscal Year ended 30th June 1900.

	Pieces.
Square Timber .....	9,809
Saw-logs.....	3,086,879
Boom and Dimension Timber.....	36,244
Round and Flat Timber .....	6,539
Cedars.....	38,471
Rail Road Ties.....	401,278
Fence Posts.....	139,772
	3,718,962

Also 13,863, 43/128 cords pulp wood.

The revenue accrued on the above was \$40,256.88.

EDWARD T. SMITH,

*Collector of Slide and Boom Dues.*

DEPARTMENT OF PUBLIC WORKS,  
 Ottawa, 30th September 1900.

64 VICTORIA, A. 1901

No. 5. —STATEMENT showing the dues accrued on the undermentioned works on the River Ottawa and its tributaries during the Fiscal Year ended 30th June 1900.

River or other Improvement.	Amount.
	\$ cts.
Main Ottawa .....	4,051 02
Cheneaux Boom .....	6,258 43
River Petewawe .....	8,804 18
" Madawaska .....	3,399 25
" Coulonge .....	6,140 30
" Dumoine .....	409 97
Black River .....	2,906 79
Gatineau .....	8,286 94
	<u>\$40,256 88</u>

Amounting to \$40,256.88.

EDWARD T. SMITH,

*Collector of Slide and Boom Dues.*

DEPARTMENT OF PUBLIC WORKS,

Ottawa, 30th September 1900.

## SESSIONAL PAPER No. 19

No. 6.—STATEMENT of Slide and Boom Dues from the St. Maurice Slides and Works, outstanding on 30th June, 1892, and remaining uncollected on the September 30, 1900.

Name.	Year to which Dues belong.	Amount.	Total.	Remarks.
		\$ cts.	\$ cts.	
Geo. Baptist, Son & Co.	1878	469 95	.....	Have counter claims for damages to logs caused by the booms not being stretched early enough in the spring of 1878 to prevent the logs going over the Chutes.
"	1879	2,110 62	.....	
"	1880	1,696 18	.....	
"	1881	293 69	.....	
"	1882	165 80	.....	
"	1884	118 50	.....	These claims were submitted to Special Commissioner, Mr. McDougall, afterwards Judge, who, after hearing the evidence on both sides, recommended that the claims of the parties should be allowed.
"	1888	4 28	.....	
			4,859 02	
Ross, Ritchie & Co....	1878	3,072 84	.....	
"	1883	2,173 68	.....	
"	1884	28 96	.....	
"	1886	1 62	.....	
"	1887	4 38	.....	
			5,281 48	
Alex. Baptist.....	1879	.....	2,116 96	
Wm. Ritchie & Co....	1888	779 24	.....	
"	1889	332 11	.....	
			1,111 35	Of this amount \$754.20 is claimed to be an overcharge. Insolvent.
Ritchie Bros.....	1886	413 43	.....	
"	1887	634 71	.....	
			1,048 14	This amount is composed of overcharges in 1886 and 1887 of \$842.76, and overpayment in 1884 of \$205.38
G. B. Hall.....	1890	.....	49 34	Insolvent.
T. E. Normand.....	1890	.....	14 28	Claims that this balance is an overcharge.
Trefflé Biron.....	1891	.....	0 92	Would cost more to collect than it is worth.
			14,481 49	

To make this balance agree with the Public Accounts, there should be deducted \$7.93 overcredited to Alex. Baptist, and \$217.17 added thereto, being \$190.40 paid 23rd July, 1884, and \$26.77 overcharged in error to Wm. Little, not in any of the Collector's returns, which will give balance due 30th September, 1894, of \$14,690.73.

EDWARD T. SMITH.

DEPARTMENT OF PUBLIC WORKS,  
OTTAWA, 30th September, 1900.

*Collector of Slide and Boom Dues.*

64 VICTORIA, A. 1901

No. 7 — STATEMENT of Slide and Boom Dues accrued from the Newcastle and Trent River Works, outstanding on the 30th June 1900 and remaining uncollected on the 30th September, 1900.

Name.	Year to which Dues belong.	Amount.	Total.	Remarks.
		\$ cts.	\$ cts.	
Irwin & Boyd .....	1881 .....	50 70		Insolvent.
Thomson & McArthur...	1880 .....	52 78		"
Jabez Thurston .....	1882 .....	12 50		"
McDougall & Ludgate...	1879 .....	65 07		"
Bigelow & Trounce .....	1882 to 1885 .....	216 21		"
R. & G. Strickland .....	1882, 1883, 1885, 1886 & 1887.	215 08		"
Estate late Geo. Hilliard.	1877 to 1883 & 1886 .....	354 15		Dead and estate distributed.
T. G. Hazlett .....	1881, 1882, 1884 to 1889 .....	885 25		
J. M. Irwin .....	1882, 1883, 1885 to 1888 .....	608 45		
D. Ulyott .....	1881 to 1887 .....	547 68		According to judgment in
Green & Ellis .....	1881 to 1883, 1885, 1888 & 1889.	157 01		Exchequer
A. W. Parkin .....	1884, 1885, 1888, 1890 & 1891.	65 92		Court vs Boyd
The Dixon Estate .....	1883 .....	137 50		vs Smith these
Alfred McDonald .....	1888 .....	40 80		cannot be col-
John Parkin .....	1889 .....	13 00		lected.
Gilmour & Co. ....	1893 .....	690 58		
The Rathbun Company..	1893 .....	1,846 57		
			6,058 34	

EDWARD T. SMITH,

*Collector of Slide and Boom Dues.*

DEPARTMENT OF PUBLIC WORKS,

OTTAWA, 30th September, 1900.

THE DRY DOCK AT ESQUIMALT, B.C.

No. 8.—STATEMENT of dues and other charges collected during the year ended  
 30th June 1900.

NAME OF VESSEL DOCKED.	Tonnage.	PERIOD OF DOCKAGE.		Dockage Charges.	Other Charges.	Total.
		From	To			
		1899	1900	\$ cts.	\$ cts.	\$ cts.
H.M.S. Sparrowhawk.....	265	June 26	July 17	775 79		775 79
Str. Port Albert.....	3,514	July 26	" 27	400 00		400 00
Str. Bristol.....	1,983	" 31	Aug. 1	250 00		250 00
H.M.S. Virago.....	265	Aug. 23	" 26	297 03		297 03
Government Str. Earl.....	54	April 10	April 15	17 50		17 50
" Princess.....	50	Sep't. 6	Sep't 9	250 00	10 26	260 26
Str. Charmer.....	609	Oct. 28	Oct. 30	200 00	7 20	207 20
H.M.S. Phaeton.....	4,300	" 30	Nov. 2	190 84		190 84
H.M.S. Icarus.....	970	Nov. 6	Dec. 1	934 02		934 02
H.M.S. Pheasant.....	755	" 6	" 1			
H.M.S. Leander.....	4,300	Dec. 4	" 13	381 88		381 88
		1900	1900			
H.M.S. Virago.....	265	Jan'y 8	Jan'y 13	403 87		403 87
H.M.S. Sparrowhawk.....	265	" 8	" 13			
Str. Robert Adamson.....	2,992	Feb. 19	Feb. 20	400 00	1 00	401 00
Governm't Str. Quadra and Pile Driver.....	573	March 5	March 10	350 00	2 40	352 40
H.M.S. Egeria.....	940	" 12	" 22	423 29		423 29
S.S. Garonne.....	3,876	May 14	May 16	477 52	7 80	485 32
H.M.S. Hero.....	3,718	" 19	" 21	474 36		474 36
H.M.S. Leander.....	4,300	June 4	June 7	185 94		185 94
Str. Bristol.....	1,983	" 8	" 9	200 00	19 20	219 20
				6,612 04	47 86	6,659 90

EDWARD T. SMITH,

*Collector of Public Works Revenue.*

DEPARTMENT OF PUBLIC WORKS,

Ottawa, 30th September 1900.

## THE DRY DOCK AT LEVIS.

No. 9.—STATEMENT of Dues and other charges collected during the Year ending 30th June, 1900.

NAME OF VESSEL DOCKED.	Tonnage.	PERIOD OF DOCKAGE.		Dockage Charges.	Other charges.	Total.
		From	To			
		1899.	1900.	\$ cts.	\$ cts.	\$ cts.
SS. Canada.....	4,314 15	July.	Entry Fee	200 00	.....	200 00
".....	16	"	27 July.	1,562 80	.....	1,562 80
SS. Merrimac.....	4,177 20	Aug.	Entry Fee	200 00	.....	200 00
".....	20	"	10 Oct.	7,050 54	25 00	7,075 54
SS. Framnes.....	1,498 3	Nov.	Entry Fee	200 00	.....	200 00
".....	4	"	11 Nov.	621 87	.....	621 87
		1900.	1900.			
Dredges Nos. 8 and 11.....	300 30	April. 11	May.	442 50	.....	442 50
SS. Activ.....	1,377 6	June. 7	June.	411 97	2 00	413 97
				10,689 68	27 00	10,716 68

EDWARD T. SMITH,

*Collector of Public Works Revenue.*

DEPARTMENT OF PUBLIC WORKS,

OTTAWA, 30th September, 1900.



## THE DRY DOCK AT KINGSTON.

No. 10.—STATEMENT of Dues and other Charges collected during the Year ending 30th June 1900.

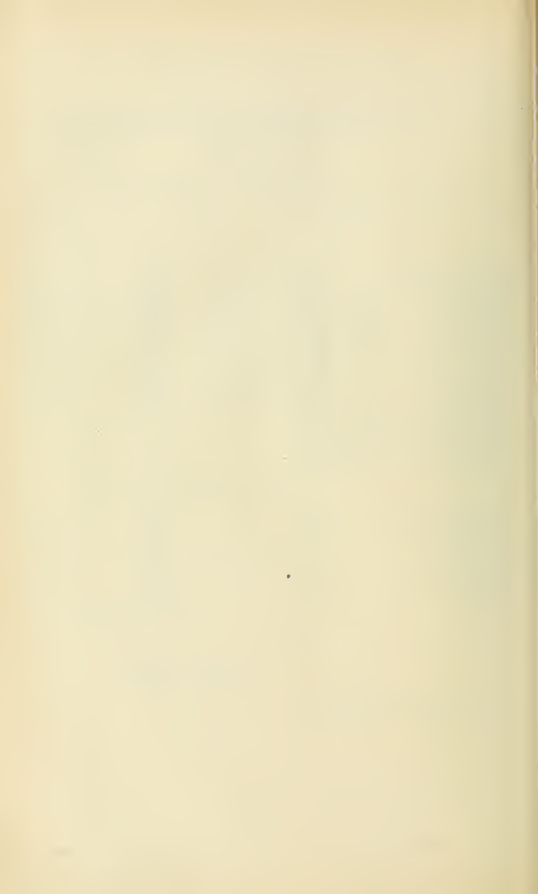
NAME OF VESSELS DOCKED.	Tonnage.	PERIOD OF DOCKAGE.		Dockage Charges.	Other Charges.	Total.
		From	To			
		1899.	1899.	\$ cts.	\$ cts.	\$ cts.
Str. New Island Wanderer.....	123 6	July. 7	July.	44 60		44 60
Barge Cornwall .....	586 12	" 14	"	149 62		149 62
Barge Waubashene.....	478 17	" 18	"	95 60		95 60
Tug Jessie Hall .....	56 24	" 25	"	20 00		20 00
Str. Islander.....	119 2	Aug. 3	Aug.	23 80		23 80
Str. Glengarry.....	732 9	" 11	"	174 44		174 44
Str. Capt. Visger .....	100 25	" 26	"	20 00		20 00
Str. Rival .....	125 1	Sept. 3	Sept.	45 00		45 00
Tug Petrel .....	346 4	" 17	"	370 34		370 34
Str. D. D. Calvin .....	750 2	Oct. 3	Oct.	135 50		135 50
Tug Active .....	302 3	" 6	"	112 68		112 68
Barge Cornwall.....	586 25	" 26	"	108 60		108 60
Barge Hector .....	539 4	Nov. 4	Nov.	103 90		103 90
Barge Selkirk .....	719 20	" 22	"	172 23		172 23
Tug St. Paul .....	45 }					
Dredge Nipissing .....	105 }					
Dredge Queen .....	85 }					
and two Scows.....	50 }					
Str. Elfinmere .....	1,054 16	Dec. 31	"	1,188 32	22 00	1,210 32
		1900.	1900.			
Str. Tecumseh .....	840 17	April 18	April	192 80	5 00	197 80
Str. New Island Wanderer.....	123 19	" 21	"	44 60		44 60
Str. Glengarry.....	732 21	" 22	"	148 82	5 00	153 82
Barge Muskoka .....	481 25	" 28	"	180 38		180 38
Str. W. Johnson .....	95 9	May 10	May	20 00		20 00
Str. L'Loyd S. Porter .....	536 31	" 31	"	103 60	5 00	108 60
Barge Melrose .....	768 4	June 4	June.	126 80		126 80
Str. D. D. Calvin .....	750 15	" 16	"	135 50		135 50
Barge Regina .....	441 25	" 26	"	88 20		88 20
Str. Islander.....	119 27	" 28	"	33 80		33 80
				\$4,077 13	\$37 00	\$4,114 13

EDWARD T. SMITH,

*Collector of Public Works Revenue.*

DEPARTMENT OF PUBLIC WORKS,

Ottawa, 30th September 1900.



## PART VII

## Miscellaneous.

CONTAINS ACTS OF PARLIAMENT AND ORDERS IN COUNCIL  
TRANSFERRING PROPERTIES FROM CONTROL OF PUBLIC  
WORKS TO OTHER DEPARTMENTS.

ACTS OF PARLIAMENT, PASSED AT SESSION OF 1900, HAVING  
REFERENCE TO THIS DEPARTMENT.

CONTRACTS LET BY THE DEPARTMENT.

PROPERTY PURCHASED OR SOLD.

PROPERTY LEASED TO OR BY THE DEPARTMENT.

CURATOR'S REPORT, NATIONAL ART GALLERY.

NAMES OF CHIEF OFFICERS OF THE DEPARTMENT.

NAMES OF OFFICIALS EMPLOYED ON SLIDES AND BOOMS.

NAMES OF PERSONS EMPLOYED ON GRAVING DOCKS

NAMES OF ENGINEERS, FIREMEN AND CARETAKERS OF PUBLIC  
BUILDINGS.

TABULAR STATEMENT SHOWING OPENING AND CLOSING OF  
NAVIGATION.

AND THE OFFICIAL CORRESPONDENCE OF THE DEPARTMENT

FOR THE

FISCAL YEAR ENDED JUNE 30, 1900.



## TRANSFERRING CONTROL OF PENITENTIARIES, ETC.

OTTAWA, 11th December 1900.

By 58-59 Vic. Chap. 42, Sec. 2, Section 10 of the Penitentiary Act, which reads as follows :—" The construction and repairs of buildings and other works " in the Penitentiaries shall be under the control of the Minister of Public " Works," is repealed and the following substituted therefore :—" The construc- " tion and repairs of buildings and other works in the Penitentiaries shall be " under the control of the Minister of Public Works, except in cases where, in " the opinion of the Minister of Justice, such works can be performed by con- " vict labour."

## CHAPTER XVII.

AN ACT RESPECTING FORTIFICATIONS AND MILITARY BUILDINGS  
AND THEIR MAINTENANCE AND REPAIR.

ASSENTED TO 19TH APRIL 1884.

Her Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows :—

1. Notwithstanding anything contained in the Act passed in the thirty-first year of Her Majesty's reign, chaptered twelve, and intituled "An Act respecting the Public Works of Canada," or in any other Act, the Department of Militia and Defence may, on, from or after the first day of July, in the year of Our Lord one thousand eight hundred and eighty-four, be charged with and have the control, management, maintenance and repair of all military buildings, forts and fortifications in Canada, under an order of the Governor in Council in that behalf, to be made before the day last mentioned.

## TRANSFER OF WHARFS, PIERS, &c.

EXTRACT FROM CHAPTER 84.

### AN ACT RESPECTING THE GOVERNMENT HARBOURS, PIERS AND BREAKWATERS.

Her Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows :—

1. All harbours, wharves, piers and breakwaters constructed or completed at the expense of Canada, or otherwise the property of Canada, except only such as are on or connected with canals, shall be under the control and management of the Minister of Marine and Fisheries respecting the use, maintenance and ordinary repairs thereof, the making and enforcing of regulations concerning such use, maintenance and ordinary repairs, and the collection of tolls and dues of such use.

2. The construction and repairs, and the works connected therewith, other than maintenance and ordinary repairs, shall be under the control and direction of the Minister of Public Works, 40 Vic. ch. 17, s. 1.

2. The Governor in Council may appoint or direct such officers or persons as he thinks proper, who shall have, under the direction of the Minister of Marine and Fisheries, the charge of the work hereby placed under the management and control of the said minister, and who shall collect the tolls and dues thereon and the Governor in Council may determine the remuneration to be allowed them respectively for such services. 40 Vic., ch. 17, s. 2.

3. The Governor in Council may, from time to time, on the recommendation of the Minister of Marine and Fisheries, make rules and regulations for the use and management of such harbours, wharves, piers and breakwaters, and a tariff or tariffs of the tolls and dues to be paid for the use of the same, and levied on persons or vessels using them, and on goods, wares or merchandise landed or shipped on or from off them.

7. Nothing in this Act shall be construed to impair or affect any of the powers or duties of the Minister of Public Works under the "Act respecting the Public Works of Canada," respecting the construction, improvement, repair or maintenance of the works hereinbefore mentioned, or the power of the Governor in Council to make regulations for the proper use of the said works, concerning their safety and protection from injury, and the prevention of, or liability for damages done to them, or to avoid or impair the effect of any Order in Council made under the said Act imposing or providing for the collection of tolls or dues for the use of such works, until such order is revoked, or other provisions made for the same purpose under this Act. 40 Vic., ch. 17, s. 7.

8. Nothing in this Act shall apply to the harbour of Quebec, Montreal, Toronto, St. John, N. B., Halifax, or Pictou, or any harbour under the management of commissioners appointed under any Act of the Parliament of Canada. 40 Vic. ch. 17, s. 8.

## APPLICATION FOR FORESHORE RIGHTS, TO CONSTRUCT WORKS IN NAVIGABLE WATERS.

Chapter 92, Section 5, of the Revised Statutes of Canada are as follows :—

" 5. The local authority, company or person proposing to construct any work in navigable waters for which no sufficient sanction otherwise exists, may deposit the plans thereof and a description of the proposed site with the Minister of Public Works, and a duplicate of each in the office of the registrar of deeds for the district, county or province in which such work is proposed to be constructed, and may apply to the Governor in Council for approval thereof, and shall give one month's notice of the said deposit of plans and application, by advertisement in the *Canada Gazette*, and in two newspapers published in or near the locality where such work is to be constructed. 49 V., c. 35, s. 2."

In order to better explain the bearing and requirements of said section I have the honour to append an extract from an opinion given by the Honourable the Minister of Justice with respect to certain previous applications under the act.

The Minister makes the following amongst other observations upon the papers filed :—

" (1) So far as the papers show the applicants have not complied with the requirements of the Statute that a description of the proposed site should be deposited with the Minister of Public Works, and a duplicate thereof in the office of the registrar of deeds. A plan of the site is filed, but the statute—R. S. C. Cap. 92, sec. 5—evidently contemplates more than this. There should, the Minister thinks, be a description by metes and bounds."

" (2) Before the plans and description are approved, the applicants should be required to give clear proof that they own the land and land covered with water on which they propose to erect the work. The Statute has reference to the erection of structures on lands owned by the applicants and is designed to provide for due protection to navigation. It cannot be used as a means of acquiring title to land on which the structure is to be erected. If the intention of the applicants is to obtain title to the soil and the soil is vested in the Government, application should be made for that purpose under section 33 of Cap. 13 of the Acts of 1889."

These remarks of the Minister will serve to make clear the view which will be acted upon by his Department as to the meaning and intention of the Act upon the points dealt with in them, and applicants must, in all cases, govern themselves accordingly, for, upon an application being recommended by the Chief Engineer of this Department, it is referred to the Department of Justice in order that that Department may say whether the requirements of the law have been complied with.

I may further observe that a mere statement that the provisions of the law have been complied with is not sufficient, but that satisfactory evidence must be given that duplicates of the plan or plans and of the description by metes and bounds have been deposited in the office of the registrar of deeds, as required by the Act; also, that the notices of such deposit and application, required by the Act, have been duly published; statutory declarations made in virtue of Cap. 41 R. S. C., "An Act respecting extra judicial oaths," will be accepted in proof



of these facts. The fact of publication of notices may be proved also (if the applicant prefers that method) by the production of the numbers of the papers themselves and of the *Canada Gazette*, containing said notices (pencil marked).

Since the Privy Council of Great Britain has decided that the beds of streams and navigable waters are vested in the Provincial Government, it becomes necessary for applicants for foreshore rights to obtain a deed or quit claim from the Provincial Government interested, excepting in cases when the application is made for foreshore in harbours, which still remain under the control of the Federal Government. Therefore riparian owners or lessees for a term of years, shall obtain deed or quit claim from the Provincial Government having control and from the Department of Interior for the land covered by water where they are not the owners by prior right.

Letters Patent may issue immediately for works constructed previous to 1st March 1899, on which the Department of Fisheries and Public Works report favourably.

#### SYNOPSIS.

A plan and description by metes and bounds to be deposited with the Registrar of deeds.

A copy of above, certified by the Registrar as a true copy of original on file in his office ; to be sent to this department.

The proposed work, fully described, to be advertised in the *Canada Gazette* and two local newspapers for five weeks, such advertisements to be filed in this department.

Evidence that the applicant is owner in fee simple or by long lease of foreshore and of land covered by water as above described ; to be also filed with this Department.

OTTAWA, 1st December 1900.

SIR,—I have the honour to transmit to you herewith the following statements concerning the transactions of the Department during the last fiscal year with respect to contracts and property, and which are required for insertion in the annual report 1899-1900, namely :—

No. 1. Statement of contracts let by this Department during the fiscal year ended June 30 last.

No. 2. Statement of property purchased and sold by this Department during the same period.

No. 3. Statement of property leased to and by the said Department of Public Works during the same period and,

No. 4. A list of the Public Acts of the Parliament of Canada passed at the last Session and Orders of the Governor General in Council, having reference to this Department.

I have the honour to be,

Sir,

Your obedient servant,

J. A. CHASSÉ.

*Law Clerk.*

JOS. R. ROY, Esq.,  
Acting Secretary,  
Department of Public Works.

LIST OF  
Some of the Acts of Parliament

PASSED AT THE SESSION OF 1900

HAVING

REFERENCE TO THE DEPARTMENT OF PUBLIC WORKS  
OR WORKS UNDER ITS CHARGE.



LIST of some of the Public Acts of the Parliament of Canada, passed at the Fifth Session of the Eighth Parliament, closed by Prorogation on the 18th day of July 1900, and orders of the Governor General in Council having reference to the Public Works Department or works under its charge (63-64 Victoria).

Subject.	Full Title of the Statute.	Chapter.	Page in Statute Book.
Sums granted to Her Majesty for the financial year ending 30th June, 1900, and the purposes for which they are granted.	An Act for granting to Her Majesty certain sums of money required for defraying certain expenses of the public service for the financial year ending the 30th June, 1900, and for other purposes relating to the public service.	1	3
Sums granted to Her Majesty for the financial year ending 30th June, 1900, and the purposes for which they are granted.	An Act for granting to Her Majesty certain sums of money required for defraying certain expenses of the public service for the financial year ending the 30th June, 1900.	3	7
Sums granted to Her Majesty for the financial years ending 30th June, 1900, and 30th June, 1901.	An Act for granting to Her Majesty certain sums of money required for defraying certain expenses of the public service for the financial years ending respectively the 30th June, 1900, and the 30th June, 1901, and for other purposes relating to the public service.	5	11
Amendments to the Civil Service Act, <i>re</i> "junior second, class clerks."	An Act to amend the Civil Service Act.	14	159
Interest to be paid in case of an expropriation made by the crown.	An Act to amend the Expropriation Act.	22	177
Prevention and settlement of trade disputes.	An Act to aid in the prevention and settlement of trade disputes, and to provide for the publication of statistical industrial information.	24	183

N. B.—By an Order in Council passed on the 31st January 1900, and in virtue of the provisions of the Act 62-63 Victoria, chapter 30, regulations were made and established for the preservation of health among persons employed in the construction of Public Works. *Uide*, page LII of the Statutes of Canada, 1900.

By Proclamation dated 5th May 1900, under the provisions of the Revised Statutes of Canada, chapter one hundred and fifty one and intituled "An Act respecting the preservation of peace in the vicinity of Public Works," all the provisions of the said Act, except sections numbers three to twelve, both inclusive, were brought into force upon and after the 15th of May 1900, in the north western part of the Province of Ontario.

J. A. CHASSÉ,

*Law Clerk.*

DEPARTMENT OF PUBLIC WORKS,  
OTTAWA, 1st December, 1900.



## STATEMENTS

## SHOWING

- 1st.—CONTRACTS LET BY THE DEPARTMENT OF PUBLIC WORKS OF CANADA,  
FROM JUNE 30 1899 TO JUNE 30 1900.
- 2nd.—PROPERTY PURCHASED OR SOLD BY THE DEPARTMENT OF PUBLIC  
WORKS DURING THE FISCAL YEAR ENDED JUNE 30, 1900.
- 3rd.—PROPERTY LEASED TO AND BY THE DEPARTMENT OF PUBLIC WORKS.  
DURING THE FISCAL YEAR ENDED JUNE 30, 1900.

64 VICTORIA, A. 1901

No. 1.—CONTRACTS let by the Department of Public Works of Canada from the  
30th June, 1899, to the 30th June, 1900.

Works.	Names of Contractors.	Date of Contract.	Amount.
PUBLIC BUILDINGS.			\$ cts.
<i>Government House, Parliament and Departmental Buildings.</i>			
Parliament and Departmental Buildings—			
Supply of coal.....	John Heney & Son....	June 10, 1899	19,344 00
Experimental Farm—Construction of a Root House .....	Holtby & Shearer.....	Sept. 7, 1899	3,115 00
Military Store Building .....	Bourque & Lemoine....	April 11, 1900	50,745 00
Government House—Addition to.....	McCullough & Cameron	Sept. 8, 1899	7,507 00
<i>Nova Scotia.</i>			
Amherst, Post Office. Supply of Coal....	Acadia Coal Co., Ltd..	Aug. 28, 1899	193 30
Annapolis " " " " " " " " " " " "	James Kenna .....	" 28, 1899	161 72
Antigonish " " " " " " " " " " " "	Acadia Coal Co., Ltd..	" 28, 1899	75 04
Arichat " " " " " " " " " " " "	Isidore LeBlanc & Co..	Sept. 7, 1899	70 00
" Savings Bank " " " " " " " " " " " "	" " " " " " " " " " " "	" 7, 1899	35 00
" Custom House " " " " " " " " " " " "	" " " " " " " " " " " "	" 7, 1899	35 00
Baddeck, Post Office " " " " " " " " " " " "	Burchell Bros.....	" 9, 1899	99 00
Dartmouth " " " " " " " " " " " "	Wm. Roche .....	" 2, 1899	48 00
Halifax, Dominion Building " " " " " " " " " " " "	" " " " " " " " " " " "	" 2, 1899	454 84
" Asst. Rec. Genl. office " " " " " " " " " " " "	" " " " " " " " " " " "	" 2, 1899	82 50
" Immigration Building " " " " " " " " " " " "	" " " " " " " " " " " "	" 2, 1899	241 30
" Exam'g Warehouse " " " " " " " " " " " "	" " " " " " " " " " " "	" 2, 1899	133 35
Kentville, const'n't. of a Post Office Building..	James Reid .....	Aug. 28, 1899	10,872 00
" Post Office Bldg.—Construction of heating apparatus .....	T. P. Calkin & Co....	June 29, 1900	875 00
Liverpool, Post Office Bldg.—Construction of heating apparatus .....	Frank Powers.....	Jan'y 29, 1900	815 00
Lunenburg, Post Office. Supply of Coal....	Benjamin Anderson....	Aug. 26, 1899	165 00
New Glasgow " " " " " " " " " " " "	Acadia Coal Co., Ltd..	" 28, 1899	129 42
North Sydney " " " " " " " " " " " "	Burchell Bros.....	Sept. 27, 1899	128 00
Pictou " " " " " " " " " " " "	Acadia Coal Co., Ltd..	Aug. 28, 1899	78 62
" Custom House " " " " " " " " " " " "	" " " " " " " " " " " "	" 28, 1899	110 07
Sydney, Post Office, " " " " " " " " " " " "	C. F. Routledge.....	Sept. 2, 1899	121 00
Truro " " " " " " " " " " " "	Acadia Coal Co., Ltd..	Aug. 28, 1899	134 50
Windsor " " " " " " " " " " " "	" " " " " " " " " " " "	" 28, 1899	59 98
" " " " " " " " " " " "	Fred. W. Dimock .....	" 25, 1899	124 38
Yarmouth " " " " " " " " " " " "	Killam Bros.....	" 26, 1899	264 15
<i>Prince Edward Island.</i>			
Charlottetown, Dominion Building.—Supply of Coal .....	Acadia Coal Co., Ltd..	Aug. 28, 1899	337 80
Montague, Post Office. Supply of Coal....	George Wightman .....	" 25, 1899	52 95
Summerside " " " " " " " " " " " "	James Kenna.....	" 28, 1899	311 65
<i>New Brunswick.</i>			
Bathurst, Post Office. Supply of Coal....	Robert Seely.....	Sept. 1, 1899	294 37
Chatham " " " " " " " " " " " "	Acadia Coal Co., Ltd..	Aug. 28, 1899	69 26
" " " " " " " " " " " "	R. R. Call .....	" 25, 1899	289 12
Dalhousie " " " " " " " " " " " "	Robert Seely .....	Sept. 1, 1899	146 93
Fredericton " " " " " " " " " " " "	" " " " " " " " " " " "	" 1, 1899	36 95





64 VICTORIA, A. 1901

No. 1—CONTRACTS let by the Department of Public Works. &c.—*Continued.*

Works,		Names of Contractors.	Date of Contract.	Amount.
PUBLIC BUILDINGS— <i>Continued.</i>				
<i>Ontario.</i>				\$ cts.
Almonte, Post Office.	Supply of Coal...	Wm. McArthur.....	Sept. 14, 1899	149 50
Amherstburg "	"	John Mann & Sons.....	" 5, 1899	119 42
Arnprior "	"	J. S. Moir .....	Aug. 24, 1899	178 48
Barrie "	"	Johnston & Serjeant ..	" 24, 1899	250 00
Belleville "	"	The Rathbun Co.....	Sept. 11, 1899	461 70
Berlin "	"	A. A. Pipe .....	" 11, 1899	8 62
" "	"	Kloepfer & Co.....	" 5, 1899	117 76
Brampton "	"	R. J. McCallum .....	Aug. 24, 1899	129 00
Brantford "	"	Thos' Elliott.....	" 28, 1899	298 88
Brockville "	"	Geo. E. Shields.....	Sept. 1, 1899	298 50
" "	construction of a Drill Hall.....	David S. Booth .....	June 29, 1900	42,290 00
Carleton Place, Post Office.	Sup. of Coal....	F.W. Singleton & Co..	Aug. 25, 1899	113 00
Chatham "	"	A. R. Crow.....	" 28, 1899	168 43
Colourg "	"	Geo. Thompson .....	" 26, 1899	168 00
Cornwall "	"	A. F. Mulhern.....	" 26, 1899	238 00
Dundas "	"	Chs. Sturrock .....	Sept. 11, 1899	16 75
Galt "	"	John Brownlee.....	Aug. 30, 1899	160 00
Gananoque "	"	The Rathbun Co.....	Sept. 11, 1899	86 47
" "	Custom House .....	" .....	" 11, 1899	108 00
Goderich, Post Office	"	F. Barlow Holmes.....	Aug. 26, 1899	160 64
Guelph "	"	Kloepfer & Co.....	" 28, 1899	26 67
Hamilton "	"	The Rogers Coal Co....	" 26, 1899	768 62
" "	"	Thos. Myles & Sons....	" 26, 1899	
" "	Public Bldg.—Supply of current for lighting Post Office .....	The Hamilton Electric Light and Cataract Power Co., Ltd.....	March 27, 1900	790 00
Ingersoll, Post Office.—Construction of heat- ing apparatus.....		Purdy, Mansell & Co..	Jan'y. 23, 1900	1,323 00
Kingston, Drill Hall.—Construction of heat- ing apparatus.....		McKelvey & Birch....	March 27, 1900	2,685 00
Kingston, Post Office.	Supply of Coal....	James Sowards.....	Aug. 25, 1899	191 25
" "	Custom House .....	" .....	" 25, 1899	212 50
Lindsay, Post Office	"	McLennan & Co. ....	" 25, 1899	135 31
London "	"	Bowman & Co.....	Sept. 1, 1899	66 72
" "	Custom House .....	" .....	" 1, 1899	15 26
" "	"	Campbell & Chantler..	Aug. 31, 1899	235 40
" "	Post Office .....	" .....	" 31, 1899	
Napanee "	"	The Rathbun Co.....	Sept. 11, 1899	195 50
Niagara Falls "	"	John Mann & Sons.....	" 5, 1899	60 00
Orangeville "	"	" .....	" 5, 1899	10 00
Orillia "	"	" .....	" 5, 1899	116 23
Pembroke "	"	James Stewart.....	Aug. 25, 1899	180 03
Peterborough "	"	The Rathbun Co.....	Sept. 11, 1899	163 85
" "	Custom House .....	" .....	" 11, 1899	144 87
Petrolia, Post Office	"	John Mann & Sons....	" 5, 1899	139 18
Port Arthur "	"	Western Coal Co., Ltd.	Aug. 28, 1899	130 00
Port Hope "	"	Brown & Henning .....	" 25, 1899	172 17
Prescott "	"	James Buckley .....	" 25, 1899	157 15
" "	Custom House .....	" .....	" 25, 1899	89 80
Rat Portage, Post Office, construction of heat- ing apparatus.....		Purdy, Mansell & Co..	Oct. 7, 1899	1,423 00
St. Catharines, Post Office.	Sup. of Coal....	H. M. Rogers.....	Aug. 25, 1899	147 27
St. Thomas "	"	Ellison & Lewis.....	" 26, 1899	254 50
Smith's Falls "	"	A. Foster .....	" 26, 1899	128 80
Stratford "	"	C. F. Neild.....	" 25, 1899	315 76

## SESSIONAL PAPER No. 19

No. 1.—CONTRACTS let by the Department of Public Works, &c.—*Continued.*

Works.	Names of Contractors.	Date of Contract.	Amount.
PUBLIC BUILDINGS— <i>Continued.</i>			\$ cts.
<i>Ontario—Continued.</i>			
Strathroy post office.	Supply of Coal.... Alexander Reed.....	Aug. 25, 1899	167 85
Toronto "	" " " " The Ellias Rogers Co. "	31, 1899	817 48
" custom house	" " " " " "	31, 1899	369 72
" examining warehouse	" " " " " "	31, 1899	878 18
" revenue office	" " " " " "	31, 1899	263 38
" inland revenue building—Supply of The Toronto Electric			Per 1,000
current for lighting	Light Co. ....	April 25, 1900	watts 20
Trenton post office.	Supply of Coal.... Chs. Crowe .....	Aug. 29, 1899	153 60
Walkerton "	" " " " S. W. Vogan .....	" 25, 1899	156 25
Windsor "	" " " " Robt. J. Cleminson .....	" 26, 1899	394 64
Woodstock—Construction of a public building	J. A. DesRivières.....	Oct. 9, 1899	31,790 00
<i>Manitoba.</i>			
Brandon post office.	Supply of Coal.... McIlvrde & Lane.....	Sept. 2, 1899	17 50
" "	" " " " John Hanbury .....	" 2, 1899	605 50
" experimental farm	" " " " McIlvrde & Lane .....	" 2, 1899	35 28
" "	" " " " John Hanbury .....	" 2, 1899	121 86
Portage LaPrairie public bld'g	" " " " Western Coal Co., Ltd. Aug.	28, 1899	375 22
Winnipeg post office	" " " " Alberta Ry. & Coal Co. Nov.	3, 1899	2,225 60
" custom house	" " " " Taylor & Sons .....	Aug. 28, 1899	665 49
" immig. office & sheds	" " " " " "	" 28, 1899	285 00
" indian office	" " " " " "	" 28, 1899	190 00
" examining warehouse	" " " " " "	" 28, 1899	256 50
<i>North-west Territories.</i>			
Indian Head experimental farm. Sup. of Coal.	Geo. Thompson.....	Aug. 31, 1899	250 00
Medicine Hat—Construction of a court house.	Chs. Purnal.....	" 2, 1899	6,403 30
" Const. of heating apparatus.	Williamson & McIntyre	March 19, 1900	715 00
Moose Jaw court-house.	Supply of Coal.... Robert Beard .....	Aug. 31, 1899	80 00
Regina—Construction of lands office.....	Willoughby & Mollard.	" 14, 1899	17,940 00
" court-house	Supply of Coal.... Rembler Paul.....	" 31, 1899	782 50
" raising and under building a barrack			
building .....	Donald McDougall....	March 20, 1900	4,500 00
" post office.	Supply of Coal.... Rembler Paul.....	Aug. 31, 1899	250 00
" land title's office	" " " " " "	" 31, 1899	100 00
" Dominion lands	" " " " " "	" 31, 1899	180 00
<i>British Columbia.</i>			
New Westminster—Construction of a post	Jos. Bourque & J. A.		
office &c., buildings.....	DesRivières.....	Feb. 13, 1900	50,500 00
Vancouver—Construction of a drill hall.....	Viau & Lachance .....	July 17, 1899	65,658 00
Victoria public building—Construction of			
freight elevator.....	Leitch & Turnbull,....	Jan. 22, 1900	1,945 00
HARBOURS & RIVERS.			
<i>Nova Scotia.</i>			
Englishtown—Construction of a public wharf.	Hugh McDonald .....	Aug. 14, 1899	6,197 00
New Harbour—Construction of a breakwater.	J. B. McManus.....	May 19, 1900	17,070 00
North Bay—Ingonish—Construction of a	John Heney & Henry		
breakwater.....	Smith.....	Dec. 6, 1899	27,250 00



## SESSIONAL PAPER No 19

No. 1—CONTRACTS let by the Department of Public Works, &c.—*Concluded.*

Works.	Names of Contractors.	Date of Contract.	Amount.
HARBOURS AND RIVERS— <i>Continued</i>			\$ cts.
<i>Manitoba.</i>			
Gimli, Lake Winnipeg. — Construction of a landing pier .....	John J. Vopni .....	Sept. 11, 1899	9,600 00
VESSELS, DREDGES AND PLANT.			
Construction of a marine return tubular boiler	Carrier, Lainé & Co....	Jan'y 11, 1900	3,922 00
Construction of two triple expansion engines and one Scotch marine boiler .....	John Inglis & Sons....	Feb'y 20, 1900	20,350 00
TELEGRAPH SIGNAL SERVICE.			
Big Romaine to Chateau Bay, Strait of Belle Isle — Construction of a telegraph line, 315 miles more or less .....	Xavier Gendreau .....	Aug. 11, 1899	Per mile— 125 00
Kamloops to Lower Nicola Lake, B.C — Construction of a telegraph line .....	J. H. Latrémouille ....	July 26, 1899	3,447 00
River St. Lawrence, North Shore—Transportation of telegraph poles, etc .....	F. A. C. Bickerdike ...	Aug. 19, 1899	10,700 00
River St. Lawrence, North Shore—Transportation of telegraph poles and braces .....	L. P. de Courval .....	April 19, 1900	Per pole— 1 00

J. A. CHASSÉ,

*Law Clerk.*

DEPARTMENT OF PUBLIC WORKS,

Ottawa, 1st December, 1900.

NO. 2.—STATEMENT OF PROPERTIES PURCHASED OR SOLD BY THE DEPARTMENT OF PUBLIC WORKS DURING THE FISCAL YEAR  
ENDED 30TH JUNE, 1900.

Date of Conveyance.	Vendors.	Purchasers.	Description of Property.	For what purpose.	Area.	Price.
1899.						
July 17....	Eliza Ann Lister & al.	Her Majesty	Town lots Nos. 1, 2, 3 and 4, east side of Front St., Sarnia, Ont., with premises.	For public building.	8,000 square ft.	5,000 00
Oct. 5....	James H. Olive.	"	Sale of ship "Criket".	Government purposes		1,500 00
" 13....	T. H. Cook & al.	"	Town lots Nos. 5, 6 and part of lot 7, east side of Front St., and lot No. 17, south side of Francis St., Sarnia, Ont., with buildings thereon erected	For public building.		4,000 00
" 28....	James Black	"	Part of lot No. 202, Iberville, P. Q.	Government purposes	2,420 square ft.	200 00
Nov. 13....	P. H. Guay	"	Part of lot No. 329, Victoriaville, P. Q.	For public building.		2,000 00
					10,054 ft. dry land & 28,670 ft. beach land	2,000 00
Dec. 23....	F. Morriset	"	Part of lots Nos. 135 and 136, with wharf and sheds, Cap Santé, P. Q.	For Govt. purposes.		50 00
" 29....	D. McLeod	"	Plot of land between public road and shore, North River, St. Anns, N. S.	For appr. to wharf	6,892 sq. feet.	
1900.						
Jan. 22....	Wm. Bolton & al.	"	Part of lot No. 26, 8th concession, Horton Township, Renfrew Co., Ont.	For appr. to bridge.		200 00
" 27....	D. Sproul et al.	"	Lot of land, western side of Water St., Digby, N. S.	Government purposes	5,798 sq. feet.	3,000 00
" 29....	Adella Gould Matland et al.	"	Part of lot No. 25, 8th concession, Horton Township, Renfrew Co., Ont.	For appr. to bridge.		10 00
Feb. 7....	Revd. A. Brunet	"	Part of lot No. 2, Island of Portage du Fort, P. Q.	For appr. to bridge.	4710 of an acre.	25 00
" 16....	A. M. Nanton	"	Sale of N. W. Quarter of Sect. 35, Township 42, Range 3, Saskatchewan, N. W. T.	Government purposes	17% of an acre in superficies	1 00
Mch. 15....	W. A. Galliher	"	Lot No. 1, and west half of lot No. 2, Block 1, Townsite of Nelson, being lot 16 in Group 1, Kootenay District, B. C.	For public building.		11,000 00



## No. 3.—STATEMENT of properties leased to and by the Department of Public Works during the fiscal year ended 30th June 1900.

## DEPARTMENT OF PUBLIC WORKS.

64 VICTORIA, A 1901

Date of Lease.	Lessors.	Lessees.	Property leased.	For what purpose.	Duration of Lease.	Annual Rental.
1899						
Aug. 28.	Her Majesty	The Pontiac Pac. Junc. Ry. Co. & Ottawa & Gat. Ry Co.	Ottawa Rideau Canal, lands along the line of.....	Ry. purposes	21 years	\$100.00 per annum.
Dec. 7.	"	Chs. L. Cass.				
Dec. 20.	"	The Gowrie & Block House Collieries, Ltd., of New-Castle-on-Tyne, Eng. ....	Water lot at Bayfield, N.S.	Private enterprise.	During pleasure.	5.00 "
1900						
June 1.	The Grand Grunk Ry Co.	Her Majesty	" at Port Morien, N.S. Additional space for addition to "Annex " Union Station, Toronto, Ont. ....	" " For storing Her Majesty's mail...	21 years	1.00 "
"	S. F. McKinnon	"	Rooms Nos. 107 and 110 McKinnon Building, Toronto, Ont. ....	Govern. purposes.	5 "	150.00 per month. 450.00 per annum.

J. A. CHASSÉ,  
*Law Clerk.*DEPARTMENT OF PUBLIC WORKS,  
OTTAWA, 1st December 1900.



# NATIONAL ART GALLERY.

## CURATOR'S REPORT

FOR THE FISCAL YEAR ENDED JUNE 30, 1900.



## NATIONAL GALLERY.

CHIEF ARCHITECT'S OFFICE,

OTTAWA, Dec. 12th 1900.

SIR,—I have the honour to report that the following additions have been made to the Gallery during the fiscal year ending June 30th 1900.

Oil paintings.—Portrait of the late D. Kingsford presented by the artist Chas. E. Moss, Esq.

"Young Canada," by Robert Harris, Esq., presented by Mrs. Caroline Hill.

Burial of the late Sir John Thompson—scene on the deck of H. M. S. Blenheim—by F. M. Bell Smith, presented by Mrs. Sandford.

Sculpture.—Bronze bust of the late Sir John Thompson, by L. P. Hébert.

Fourteen thousand two hundred and fifty-six visitors registered during the year, being a decrease of some seven hundred from preceding year.

This decrease may be accounted for by the fact that the Gallery was twice closed to the public during the year, once when the Royal Canadian Academy were holding their Exhibition, and again when the pictures and frames were being restored, cleaned, etc.

I beg to call your attention to the crowded condition of the Gallery, and the method of heating.

It is impossible to hang the pictures with any degree of satisfaction on account of the lack of space. An extension at the rear or at the side of the present building could be built which would prove most acceptable and be by no means extravagant.

The building is heated by stoves, a hot water apparatus would be a great improvement in cleanliness, convenience, and appearance.

I have the honour to be, Sir,

Your obedient servant,

L. FENNINGS TAYLOR.

*Curator.*

Jos. R. ROY, Esq.,

Acting Secretary, Department of Public Works.



NAMES

OF THE

Chief Officers of the Department of Public Works

WITH

DATES OF APPOINTMENT, &c., FROM 1841 To 1900.



## NAMES OF THE CHIEF OFFICERS.

The names with the dates of the appointment, &c., of the principal Officials of the Department of Public Works, from 1841 to 1900.

Names.	Capacity or Office.	Date of Appointment Served.	
		From	To
<i>Under Statute 4-5 Vic., Cap. 38.</i>			
CORPORATION BOARD OF WORKS.			
Killaly, Hon. H. H. ....	Chairman .....		
Daly, Hon. D. ....	Members .....	Dec. 29, 1841	Oct. 3, 1844,
Harrison, S. B. ....			
Sullivan, R. B. ....			
Davidson, J., Esq. ....			
Begly, Thomas A. ....	Secretary .....	Aug. 17, 1841	
Keefer, Samuel .....	Chief Engineer .....	" 17, 1841	
Rubidge, F. B. ....	Architect and Assistant Chief Engineer .....	Dec. 15, 1841	
NEW BOARD OF WORKS.			
Killaly, Hon. H. H. ....	Chairman .....		
Daly, Hon. D. ....	Members .....	Oct. 4, 1844	June 8, 1846
Draper, Hon. W. H. ....			
Morris, Hon. W. ....			
Papineau, Hon. D. B. ....			
<i>Under Statute 9th Vic., Cap. 37, &amp;c.</i>			
Robinson, Hon. W. B. ....	Chief Commissioner ....	June 22, 1846	March 10, 1848
Taché, Hon. E. P. ....	" .....	March 11, 1848	Nov. 26, 1849
Chabot, Hon. J. ....	" .....	Dec. 13, 1849	March 31, 1850
Merritt, Hon. W. H. ....	" .....	April 8, 1850	Feb. 11, 1851
Bourret, Hon. J. ....	" .....	Feb. 12, 1851	Oct. 27, 1851
Young, Hon. John .....	" .....	Oct. 28, 1851	Sept. 22, 1852
Chabot, Hon. J. ....	" .....	Sept. 23, 1852	Jan. 26, 1855
Lemieux, Hon. F. ....	" .....	Jan. 27, 1855	Nov. 25, 1857
Alleyn, Hon. C. ....	" .....	Nov. 26, 1857	Aug. 1, 1858
Holton, Hon. L. H. ....	" .....	Aug. 2, 1858	" 6, 1858
Sicotte, Hon. L. V. ....	" .....	" 7, 1858	Jan. 10, 1859
Rose, Hon. John .....	" .....	Jan 11, 1859	June 12, 1861
Cauchon, Hon. Jos. ....	Commissioner .....	June 13, 1861	May 23, 1862
Tessier, Hon. C. J. ....	" .....	May 24, 1862	" 27, 1863
Drummond, Hon. L. T. ....	" .....	" 28, 1863	July 23, 1863
Laframboise, Hon. M. ....	" .....	July 24, 1863	March 29, 1864
Chapais, J. C. ....	" .....	March 30, 1864	June 30, 1867
Casgrain, Hon. Chas. Eus. ....	Second Commissioner ...	July 9, 1846	Feb. 29, 1848
Cameron, Hon. M. ....	Assistant Commissioner ..	March 11, 1848	" 1, 1850
Westenhall, John S., Esq. ....	" .....	Feb. 2, 1850	April 16, 1850
Bourret, Hon. Jos. ....	" .....	April 17, 1850	Feb. 11, 1851
Killaly, Hon. H. H. ....	" .....	Feb. 12, 1851	May 6, 1859
Keefer, Samuel .....	Deputy Commissioner ...	May 6, 1859	March 7, 1864
Trudeau, Toussaint .....	" .....	March 8, 1864	May 29, 1868
Begley, Thos. A. ....	Secretary .....	Feb. 10, 1841	Oct. 31, 1858
Trudeau, Toussaint .....	" .....	Dec. 13, 1859	March 7, 1864
Braun, Frederick .....	" .....	March 8, 1864	July 1, 1867
Page, John .....	Chief Engineer .....	Oct. 31, 1853	Oct. 1, 1879

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The names with the dates of the appointment, &c., of the principal Officials of the Department of Public Works, from 1841 to 1900.—*Continued.*

Names.	Capacity or Office.	Date of Appointment Served.	
		From	To
<i>Under Statute 31 Vic., Chap. 12.</i>			
McDougall, Hon. Wm	Minister	July 1, 1867	Dec. 7, 1869
Langevin, C.B., Hon. Hector L.	"	Dec. 8, 1869	Nov. 6, 1873
Mackenzie, Hon. Alexander	"	Nov. 7, 1873	Oct. 16, 1878
Tupper, C.B., K.C.M.G., Sir Charles	"	Oct. 17, 1878	May 19, 1879
Langevin, C.B., K.C.M.G., Sir Hec. L.	"	May 20, 1879	Aug. 11, 1891
Smith, Hon. Frank	Acting Minister	Aug. 14, 1891	Jan. 10, 1892
Onimet, Hon. Joseph Aldéric	Minister	Jan. 11, 1892	April 30, 1896
Desjardins, Hon. Alphonse	"	May 1, 1896	July 12, 1896
Tarte, Hon. J. Israel	"	July 13, 1896	
Trudeau, Toussaint	Deputy Minister	May 29, 1868	Oct. 1, 1879
Baillargé, G. F.	"	Oct. 4, 1879	Dec. 31, 1890
Gobiel, A.	"	Jan. 1, 1891	
Braun, Frederick	Secretary	July 1, 1867	Sept. 30, 1879
Chapleau, S.	"	Oct. 1, 1879	Nov. 4, 1880
Ennis, F. H.	"	Nov. 5, 1880	Jan. 13, 1885
Gobeil, A.	"	Jan. 23, 1885	Dec. 31, 1890
Roy, E. F. E.	"	Jan. 1, 1891	" 31, 1900
Roy, J. R.	Acting Secretary	Jan. 1, 1900	
McPherson, D. A.	Assistant Secretary	" 18, 1891	April 11, 1893
Desrochers, Rudolphe Charles	"	" 8, 1896	
Page, John	Chief Engineer	July 1, 1868	Oct. 1, 1879
Perley, H. F.	"	Nov. 25, 1880	July 10, 1891
Baillargé, G. F.	Assistant Chief Engineer	July 5, 1871	" 4, 1879
Coste, Louis	Chief Engineer	" 26, 1892	March 18, 1899
Lafleur, E. D.	Acting Chief Engineer	March 18, 1899	
Scott, Thos. S.	Chief Architect	May 26, 1871	Oct. 30, 1881
Fuller, Thomas	"	Oct. 31, 1881	June 30, 1897
Ewart, David	"	Nov. 2, 1897	



NAMES  
OF THE  
Officials employed on the Slides and Booms of Canada  
*ON JUNE 30th, 1900*  
WITH  
DATES OF APPOINTMENT, SALARIES, &c.

## OFFICIALS EMPLOYED ON THE SLIDES AND BOOMS.

STATEMENT showing the Names, Dates of Appointment, Salaries, etc., of persons employed on the various Slides and Booms on June 30th, 1900.

Name.	Date of Birth.	Position.	Where employed.	Date of Appointment.	Salary.	Remarks.
<i>Collector of Slide and Boom Dues.</i>						
E. T. Smith	Nov. 26, 1846	Collector	Ottawa	July 1, 1880	\$ 1,800 00 a year	Date of first appointment to Crown timber office, Ottawa, 23rd June, 1864. Clerk, Dept. of Inland Rev., July 1, 1870, to June 30, 1880. Transferred to civil list with rank of first class clerk, January 5, 1892.
F. X. Gagné	Sept. 25, 1850	Clerk	"	Dec. 16, 1887	912 50 a year	Entered the service August 13, 1889.
James Steen	June 17, 1820	Boatman	"	July 12, 1880	60 00 a month.	Employed during the season of navigation, for 8 months each year. Date of first appointment, May 26, 1861. Timber counter, Ottawa, for Dept. of Inland Revenue, Jan. 7, 1884, to June 30, 1889.
John Redmond	August 2, 1823	Boatman	"	July 12, 1880	60 00 a month.	Employed during the season of navigation, for 8 months each year. Date of first appointment, May 1, 1872. Assistant timber counter, Ottawa, for Dept. of Inland Revenue, Jan. 7, 1884, to June 30, 1889.
<i>Saguenay District.</i>						
Saguenay district slides abandoned by authority of O.C., dated Feb. 5, 1896 (No. 168,740).						
<i>St. Maurice District.</i>						
L. P. Dallaire		Paymaster	Three Rivers	May 1, 1896	50 00 a month.	
Cyrilac Lymburner		Boom master	Grand Mère	April 25, 1881	55 00 "	
Jos. Pagé	July 7, 1845	Slide	M'th of St. Maurice	Dec. 10, 1879	60 00 "	
Jos. Dick		Asst.	Cap aux Cornelles	May 19, 1896	60 00 "	
Gédéon Rousseau		"	Shawenigan & Grès	April 7, 1896	54 16 "	
Moise Masson		Boom keeper	Grandes Piles	May 19, 1896	55 00 "	

## SESSIONAL PAPER No. 19

<i>Richelieu District.</i>						
Cyrille Choquette	boom master	Bellevue Station	July	26, 1897	100 00 a year	
<i>Ottawa District.</i>						
G. P. Brophy	Feb'y, 24, 1846	Superintendent	Ottawa	July	6, 1873	2,500 00 a year
D. Scott	15, 1850	Accountant	"	Oct.	1, 1854	1,500 00 "
J. C. Scott	June 27, 1865	Measurer	"	April	1, 1889	3 50 a day
J. Kent	Jan'y 28, 1864	Clerk	"	Aug	1, 1886	3 25 "
Wm. Cain	April 22, 1860	Messenger	"	Jan'y	1, 1892	1 35 "
Pierre St. Pierre	Dep'y slide master	Carillon	June	1, 1897	1 40 "	100 00 a year
D. Noonan	June 17, 1840	Boom master	Gatineau	March 21, 1878	500 00 a year	
J. Soulière	Nov. 8, 1829	Dep'y slide master	Chaudière	"	1878	2 50 a day
P. D. Chene	"	"	Hull	June	14, 1890	1 50 "
W. A. Sheriff	May 22, 1871	Slide master	Chats	April	26, 1898	1 50 "
John Harvey	March 26, 1869	Boom master	Arnprior	July	12, 1882	2 50 "
Joseph McCrea	"	"	Springtown	May	15, 1880	300 00 a year
Patrick Barry	" 27, 1858	Slide master	High Falls	March 10, 1888	1 50 a day	
Duncan McLaren	Jan'y 7, 1860	Dep'y slide master	Portage du Fort	Sept. 7, 1881	456 25 a year	
D. Rochon	"	"	Black River	"	480 00 "	
Wm. Selkirk	"	"	Lower Petewawa	"	2 00 a day	
P. O'Connor	"	"	Upper Petewawa	"	2 00 "	
Wm. Thomson	May 3, 1843	"	Mountain	March 18, 1898	1 25 "	" 6 mos.
G. H. Brabazon	"	"	Calumet	Oct. 10, 1879	1 25 "	" 6 to 7 mos.
John Mullin	"	"	Coulange	April 1, 1894	30 00 a month	" 4 mos.
H. R. Downey	May 16, 1846	"	Des Joachims	July 1, 1889	360 00 a year	"
J. F. McGuire	"	"	Dumoine	May 1, 1897	300 00 "	"
J. J. French	"	"	Crooked Chute	"	300 00 "	Employ, 3 mos. during season of navigation. Will inspect works when required.
J. W. Carmichel	"	"	Rocher Capitaine	Dec. 24, 1896	2 00 "	"
A. H. Johnson	Nov. 28, 1839	"	Chenaux	"	2 50 "	Paid during season of navigation. Attends to repairs in winter.
G. T. Johnson	Sept. 10, 1841	"	"	"	1 75 "	"

*Ottawa River Works.*—In addition to the above officers, etc., there are employed during the running season, one foreman on slide at \$1.50 and one assistant foreman at \$1.25 a day; also 25 to 30 labourers at from \$1 to \$1.40 a working day.

Actively employed about 7 mos. Oversees repairs in winter.

Employed about 6 months.

Oversees repairs in winter.

Actively employed about 7 months.

Employed about 3 months during season of navigation.

Employed 3 mos. during season of navigation. Oversees repairs in winter.

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STATEMENT showing the Names, etc., of persons employed on the various Slides and Booms, etc.—*Continued.*

Name.	Date of Birth.	Position,	Where employed.	Date of Appointment.	Salary.	Remarks.
<i>Newcastle District.</i>						
R. B. Rogers.	Jan'y 17, 1857	Superintendent	Peterboro'	July 1, 1884	\$ 800 00 a year	Receives \$800 a year from Department of Railways and Canals.
G. H. Giroux		Clerk, Supt's office.	Peterboro'	" 1, 1880	400 00 "	" \$100
R. A. Wagar.		Slide master	Chisholm Rapids	June 15, 1898	200 00 "	"
W. T. Junkin		"	Fenelon Falls	Nov. 15, 1896	100 00 "	\$250 a year as lock master " R. & C.
R. T. Hill		"	Backhorn	July 1, 1891	100 00 "	Receives \$150 a year from Department of Railways and Canals.
Hamilton Johnston		"	Heeley's Falls	" 15, 1893	200 00 "	"
John Dinwoodie.		"	Lakefield	June 20, 1893	150 00 "	"
<i>Richelieu District.</i>						
C. Choquette.		Boom master	Beleil Station	July 26, 1897	100 00 "	"
<i>Burlington Channel.</i>						
<i>Saring Bridge.</i>						
Wm. Omand.		Bridge attendant	Burlington	Sept. 19, 1896	600 00 a year	
R. Fletcher				July 1, 1899	"	
A. McDonald		Bridge assistant	Burlington	April 1, 1896	1 25 a day	Employed 9 months.
C. Rasberry		"	"	Sept. 19, 1896	1 25 "	"
Jos. Fustice.		"	"	" 19, 1896	1 25 "	"
<i>Yamaska District.</i>						
H. Lambert.		Lock keeper	Yamaska	July 1, 1897	40 00 a month.	
O. Mineau.		"	"	Sept. 1, 1885	40 00 "	
<i>Rivière du Lièvre.</i>						
Hugh Gorman		Lock master	Rivière du Lièvre.	April 15, 1897	40 00 "	
James Brazeau		Labourer	"	" 15, 1897	35 00 "	

JOS. VINCENT.

NAMES

OF

Persons employed on the various Graving Docks

*ON JUNE 30th, 1900*

WITH

DATES OF APPOINTMENT, SALARIES, &c.

## GRAVING DOCK EMPLOYEES.

STATEMENT showing the Names, Dates of Appointment, Salaries, &c, of persons employed on the various Graving Docks,  
June 30, 1900.

Name.	Date of Birth.	Position.	Where employed.	Date of Appointment.	Salary.	Remarks.
<i>Esquimalt Graving Dock</i> <i>British Columbia.</i>						
John Devereux.....		Dockmaster.....	Esquimalt.....	Sept. 17, 1887.	\$166 66 a month.	
A. C. Muir.....		Engineer.....	".....	April 1, 1887.	100 00 "	
J. W. Muir.....		Asst. engineer.....	".....	Jan. 11, 1892.	80 00 "	
A. D. Greeves.....		Carpenter.....	".....	Dec. 1, 1887.	80 00 "	
F. M. Jones.....		Stoker.....	".....	July 1, 1890.	60 00 "	
G. Springer.....		".....	".....	".....	60 00 "	
John Stock.....		Watchman.....	".....	July 1, 1894.	50 00 "	
<i>Lévis Graving Dock</i>						
Alf. Samson.....		Dockmaster.....	Lévis.....	Feb. 15, 1900.	1,000 00 a year.	
Wm. Macdougall.....		Mechanical engineer.....	".....	June 1, 1888.	75 00 a month.	
T. Guilbault.....		Asst mechanical eng.....	".....	Sept. 1, 1897.	45 00 "	
Narcisse Lemelin.....		Fireman.....	".....	June 1, 1888.	32 00 "	
<i>Kingdon Graving Dock</i>						
F. S. Rees.....		Dockmaster.....	Kingston.....	April 1, 1897.	1,000 00 a year.	
Robert McLeod.....		1st engineer.....	".....	July 1, 1892.	75 00 a month.	
Wm. Geaghean.....		Fireman.....	".....	".....	45 00 "	
C. Staley.....		Watchman.....	".....	".....	45 00 "	

JOS. VINCENT.

LIST OF

Engineers, Enginemen, Firemen and Caretakers

EMPLOYED

*IN THE PUBLIC BUILDINGS THROUGHOUT THE DOMINION  
ON JUNE 30th. 1900*

GIVING

DATES OF APPOINTMENT, SALARIES, &c.

ENGINEERS AND CARETAKERS, PUBLIC BUILDINGS.

STATEMENT showing the Names, &c., of the Engineers, Firemen, Caretakers, Hoist Attendants and Watchmen employed at Dominion Public Buildings on June 30, 1900.

Place.	Building.	Name.	Date of Birth.	Position.	Date of Appointment.	Monthly employed Salary.	Time employed each year.	Yearly Salary.
						£	cts.	£
N S								
Aniherst.	Post office.	James Morrison.	May 2, 1824	Caretaker	Nov. 2, 1886	33	33	12 months
Antigonish.	Public building.	Angus McDonald.	March —, 1820	"	Feb. 5, 1891	33	33	12 "
Annapolis.	Post office and C. house	John McKay.	Oct. 25, 1847	"	April 1, 1891	33	33	12 "
Baddeck.	Public building.	D. F. McKenzie.	May 20, 1848	"	Jan. 21, 1898	16	67	12 "
Dartmouth.	"	I. C. Henley.	Dec. 11, 1846	"	May 22, 1894	20	83	12 "
Halifax.	Dominion building.	Richard Power.	Aug. 15, 1834	Engineer	Oct. 1, 1871	62	50	12 "
"	"	John Powell.	" 21, 1836	Fireman.	" 1, 1871	50	00	8 "
"	"	J. F. Sullivan.	April 16, 1866	Caretaker	July 1, 1892	33	33	12 "
"	"	W. H. Gray.	Nov. 26, 1848	Watchman.	Sept. 10, 1891	30	00	12 "
"	Drill hall.	R. Harmon.	Dec. 25, 1868	Fireman.	Dec. 5, 1898	50	00	12 "
"	Examining warehouse.	M. O'Neil.	Nov. 30, 1850	Caretaker	Oct. 1, 1897	33	33	12 "
"	Immigrant building.	John Oxley.	April 17, 1856	Fireman.	Feb. 2, 1897	50	00	12 "
Lunenburg.	Public building.	J. E. Hebb.	Nov. 5, 1843	Caretaker	June 7, 1895	25	00	12 "
New Glasgow.	Post office.	Daniel McDonald.	Dec. 17, 1832	"	Oct. 1, 1889	25	00	12 "
North Sydney.	Public building.	Alex. Green.	July 10, 1825	"	Nov. 1, 1897	20	16	12 "
Pictou.	Post office and C. house	Jas. Arbuckle.	Feb. 18, 1836	"	Dec. 20, 1897	20	16	12 "
"	"	L. Keefe.	May 5, 1846	"	Nov. 1, 1897	20	16	12 "
"	"	Alex. Smith.	" 17, 1857	"	April 1, 1897	25	00	12 "
"	"	J. A. Mosher.	Nov. 16, 1841	"	Sept. 22, 1892	33	33	12 "
Windsor.	Public building.	W. H. Whalen.	Jan. 1, 1836	" & fireman	March 1, 1900	33	33	12 "
Yarmouth.	Dominion building.	Wm. J. Fraser.	Aug. 28, 1826	Messenger.	Jan. 19, 1875	37	00	12 "
Charlottetown.	"	Geo. Walker.	Jan. 8, 1855	"	Nov. 1, 1896	33	33	12 "
"	"	M. A. Allan.	March 12, 1856	Watchman.	May 9, 1898	13	33	12 "
"	"	Angus McKenzie.	Oct. —, 1831	Caretaker	Sept. 1, 1897	33	33	12 "
Montague.	Public building.	W. Gillis.	Sept. 25, 1835	"	April 13, 1897	33	33	12 "
Summerside.	Dominion building.	A. MacSween.	Jan. 20, 1825	"	March 27, 1895	25	00	12 "
Bathurst.	Post office.	J. A. Melançon.	May 18, 1856	"	Oct. 1, 1889	8	33	12 "
Chatham.	"	C. Johnston.	Aug. 15, 1823	"	Nov. 26, 1890	33	33	12 "
Carleton, St. John.	"	James R. Reid.	Jan. 1, 1853	"				
Dalhousie.	"	Wm. Gould.		"				



## SESSIONAL PAPER No. 19

	N.B.	Post office	James Perkins	Oct.	5, 1847	Caretaker	May	31, 1881	33 33	12 months	400 00
Fredericton			E. B. Hicks	Jan.	11, 1832		Jan.	11, 1886	33 33	12	400 00
Moncton			Patrick Keating	March	13, 1840		Oct.	25, 1886	33 33	12	400 00
Newcastle			Samuel Topping	April	2, 1839		May	25, 1887	33 33	12	400 00
St. Stephen			Shepherd Dryden	May	18, 1839		Jan.	15, 1897	16 66	12	200 00
Sussex			Neil J. Morrison	July	25, 1858	Eng. & caretak'r	April	27, 1894	60 00	12	720 00
St. John			Christopher White	Nov.	20, 1844	Fireman	Nov.	9, 1885	50 00	12	600 00
"			James A. Paul	Aug.	1, 1857	Caretaker	Oct.	13, 1891	41 67	12	500 00
"			James Wolfe	March	10, 1850	Engineer	Dec.	1, 1893	55 00	12	600 00
"			Edward Hauey	Feb.	22, 1849	Hoist attendant	Nov.	27, 1882	50 00	12	600 00
"			Charles Trafton	Jan.	20, 1839	Caretaker	May	1, 1897	33 33	12	600 00
"	P.Q.		Miss M. G. Woods	May	16, 1840		April	20, 1895	5 00	12	400 00
"			J. Ralston	Nov.	16, 1839		Nov.	15, 1899			
Public building			Israel Baldwin	Nov.	16, 1839		June	27, 1889	33 33	12 months	400 00
Post office			Z. Raymond	—	1831		Nov.	27, 1897	25 00	12	300 00
"			J. I. Madore	March	8, 1900		Sept.	1, 1897	33 33	12	150 00
"			A. Ratel	Dec.	20, 1845		Jan.	26, 1899	8 33	12	400 00
"			P. O. Robert	Sept.	7, 1846		Nov.	13, 1894	4 16	12	100 00
"			A. Thomas	Aug.	8, 1848		June	25, 1898		12	50 00
"			J. Lespérance	June	18, 1836	Foreman engin'r	March	4, 1882	100 00	12	1,200 00
Dominion buildings			Thomas Ryan	April	14, 1837	Caretaker	Dec.	3, 1898	41 67	12	300 00
"			Ed. Lauctot	Feb.	18, 1848	Fireman	March	4, 1882	50 00	12	600 00
Examining warehouse			M. Boyer	Dec.	12, 1846		Dec.	1, 1898	45 00	8	300 00
"			N. Loisel	Oct.	4, 1837	Engineer	Jan.	1, 1885	60 00	12	720 00
Post office			F. Green	Jan.	28, 1861	Electrician	June	1, 1885	60 00	12	720 00
"			L. D. Thibault	Dec.	13, 1867	&c.	Jan.	7, 1895	60 00	12	720 00
"			G. S. Gingras	Dec.	13, 1867	Elevator man	Sept.	10, 1898	50 00	12	600 00
"			Oscar Renaud	July	25, 1867		Dec.	15, 1893	50 00	12	600 00
"			Art. Forget	Dec.	25, 1871		March	1, 1894	55 00	12	600 00
"			S. N. Nickle	May	17, 1842	Caretaker w. c.	Feb.	6, 1894	125 p.d.	12	450 25
"			C. Vadebonceur	Sept.	17, 1840	Fireman	Dec.	1, 1892	50 00	12	600 00
Inland revenue			Louis St. Jean	Sept.	6, 1840			2, 1882	45 00	12	540 00
Custom house			H. Marchand	June	18, 1843		July	16, 1892	20 16	12	350 00
"			C. Dautelin	Nov.	20, 1861		Nov.	25, 1896	50 00	12	600 00
Cust. h. and ex-wareh.			B. Lajeunesse	Sept.	17, 1832	Engineman	Feb.	21, 1888	45 00	12	540 00
Drill hall and armour's			Wm. McDonald	Feb.	9, 1865	Engineer	April	1, 1897	75 00	12	900 00
Examining warehouse			D. P. Kennedy	Aug.	25, 1871	Fireman	Aug.	26, 1892	33 33	12	640 00
"			T. P. McLaughlin	Aug.	15, 1861			1, 1894	45 00	12	540 00
Culler's office			James O'Neil	Nov.	1, 1848		Nov.	10, 1888	45 00	12 months	540 00
Custom house			John R. Mountain	Feb.	25, 1836	Caretaker	Sept.	1, 1897	58 23	12	700 00
Post office			J. Roy	March	23, 1852		April	1, 1900	12 50	12	150 00
"			Mrs. C. Garon	July	14, 1869		May	1, 1898	12 50	12	150 00
"			H. Demaris	Aug.	8, 1848		April	2, 1898	33 33	12	400 00
"			O. Desève	Jan.	22, 1848		Sept.	1, 1897	33 33	12	400 00
"			C. Robitaille								

64 VICTORIA, A 1901

STATEMENT showing the names, &c., of the Engineers, Enginemen, Firemen, Caretakers, Hoist Attendants and Watchmen employed at the Dominion Public Buildings, &c.—*Continued.*

Place.	Building.	Name.	Date of Birth.	Position.	Date of Appointment.	Monthly Salary.	Time employed each Year.	Yearly Salary.
						\$ cts.		\$ cts.
St. Henri.....	P.Q.	A. C. A. Bissonnette.	Nov. 8, 1846	Caretaker	March 4, 1895	33 33	12 months.	400 00
St. Hyacinthe ..	Public building	F. X. Tétrault .....	Jan. 21, 1849	Fireman .....	Aug. 5, 1893	33 33	12 months.	400 00
St. Johns .....	Post office .....	L. Forant .....	Oct. 24, 1859	Caretaker .....	April 14, 1897	29 16	12 "	350 00
St. Jérôme .....	Public building ..	J. Savard .....	Oct. 3, 1828	" .....	Sept. 1, 1900	29 16	12 "	350 00
Three Rivers .....	Custom house .....	Ph. Gravelle .....	July 2, 1850	" .....	Feb. 1, 1891	25 00	12 "	300 00
" .....	Post office .....	A. Gauthier .....	Aug. 22, 1825	" .....	" 1, 1898	33 33	12 "	400 00
Anheerburg .....	" .....	R. Elliott .....	March 23, 1839	" .....	May 7, 1897	33 33	12 "	400 00
Almonte .....	" .....	Wm. Moulton .....	Jan. 11, 1862	" .....	Jan. 29, 1891	33 33	12 "	400 00
Arnprior .....	Public building ..	R. B. McCreary .....	" 1, 1846	" .....	March 15, 1899	33 33	12 "	400 00
Brockville .....	Post office .....	W. H. Moore .....	April 24, 1842	" .....	Jan. 8, 1896	33 33	12 "	400 00
Brantford .....	" .....	John Squire .....	Nov. 1, 1857	" .....	Oct. 27, 1880	50 00	12 "	600 00
Barrie .....	" .....	R. D. Hill .....	Nov. 27, 1820	" .....	June 26, 1896	33 33	12 "	400 00
Belleville .....	" .....	J. P. Reeves .....	June 21, 1840	" .....	Oct. 17, 1885	50 00	12 "	600 00
Berlin .....	" .....	J. C. Lemens .....	Oct. 5, 1840	" .....	May 15, 1900	33 33	12 "	400 00
Brampton .....	" .....	James McBride .....	April 17, 1858	" .....	Jan. 29, 1891	33 33	12 "	400 00
Carleton Place ..	" .....	Jas. F. Halpenny .....	May 25, 1848	" .....	May 13, 1892	25 00	12 "	300 00
Chatham .....	" .....	W. W. Mitchell .....	Nov. 6, 1848	" .....	Jan. 7, 1885	33 33	12 "	400 00
Cornwall .....	" .....	R. Conroy .....	May 29, 1861	" .....	April 1, 1897	33 33	12 "	400 00
Cayuga .....	" .....	G. A. Gibson .....	Jan. 31, 1854	" .....	Sept. 3, 1891	4 16	12 "	50 00
Cobourg .....	" .....	H. J. Payne .....	Dec. 5, 1853	" .....	April 24, 1890	33 33	12 "	400 00
Dundas .....	" .....	Wm. Graham .....	March 3, 1857	" .....	July 1, 1898	4 16	12 "	50 00
Galt .....	" .....	Wm. Kilgour .....	May 20, 1834	" .....	Sept. 23, 1886	33 33	12 "	400 00
Guelph .....	" .....	Robert Hughson .....	Feb. 25, 1834	" .....	Oct. 29, 1889	33 33	12 "	400 00
Goderich .....	" .....	T. P. Richardson .....	April 14, 1851	" .....	May 1, 1889	33 33	12 "	400 00
Hamilton .....	" .....	G. Bissett .....	Dec. 27, 1847	" .....	Sept. 10, 1894	29 16	12 "	350 00
" .....	Dominion building	Alfred Barnard .....	Aug. 7, 1863	Fireman .....	Oct. 1, 1896	40 00	8 "	520 00
" .....	" .....	J. Wigglesworth .....	Dec. 17, 1857	Engineer .....	March 2, 1887	50 00	12 "	600 00
" .....	" .....	Thos. Nicholson .....	Sept. 25, 1849	Fireman .....	Dec. 6, 1897	45 00	8 "	540 00
" .....	Drill hall .....	H. Morris .....	Dec. 12, 1842	Engineer .....	May 31, 1881	65 00	12 "	780 00
" .....	Military college ..	Wm. Johnston .....	Dec. 22, 1838	Fireman .....	Oct. 12, 1878	55 00	12 "	660 00
" .....	" .....	M. Madden .....	Sept. 4, 1837	Engineman .....	Sept. 18, 1888	50 00	12 "	600 00
" .....	Custom house .....	M. McKern .....	" .....	" .....	" .....	" .....	" .....	" .....



64 VICTORIA, A 1901

STATEMENT showing the Names, &c., of the Engineers, Enginemen, Firemen, Caretakers, Hoist Attendants and Watchmen employed at the Dominion Public Buildings, &c.—*Continued.*

Place.	Building.	Name.	Date of Birth.	Position.	Date of Appointment.	Monthly Salary.	Time employed each Year.	Yearly Salary.
						\$	cts.	\$
Winnipeg	Man. Custom house	J. R. Russell	Oct. 20, 1851	Fireman	Dec. 12, 1899	43 00	12 months	540 00
Calgary	Public building	G. L. Fraser	Oct. 8, 1845	Caretaker	Aug. 1, 1894	40 00	12 "	480 00
"	Court-house	E. N. Brown	March 7, 1859	"	Jan. 24, 1891	43 00	12 "	540 00
Edmonton	Land and registry office	R. Wylie	July 15, 1849	"	June 21, 1894	33 33	12 "	400 00
Lethbridge	Court house & C-house	Robert Sage	Oct. 15, 1849	"	Aug. 26, 1894	35 00	12 "	420 00
Moosomin	"	J. C. Jopp	Jan. 6, 1848	"	April 20, 1897	50 00	12 "	600 00
Moosejaw	"	R. Smale	July 21, 1865	"	Nov. 21, 1898	53 33	12 "	600 00
Macleod	"	John Ryan	June 24, 1827	"	" 1, 1893	14 58	12 "	175 00
Medicine Hat	"	J. H. G. Bray	Jan. 24, 1841	"	June 1, 1900	45 00	12 "	540 00
Prince Albert	" and jail	J. Savard	Aug. 14, 1850	Fireman	Nov. 11, 1897	40 00	8 "	320 00
"	Land and registry office	George Cassie	Jan. 13, 1833	Caretaker	Aug. 25, 1883	33 33	12 "	400 00
Regina	Court house & C-house	P. McAra	March 24, 1840	"	" 1, 1889	45 00	12 "	540 00
"	" &c.	Jas. McLachlan	Dec. 9, 1840	Fireman	Oct. 3, 1898	40 00	8 "	320 00
Wolsley	"	Charles Taylor	June 11, 1844	Caretaker	" 2, 1895	45 00	12 "	540 00
Nanaimo	Post office	J. Thompson	Sept. 2, 1836	"	May 1, 1897	50 00	12 "	600 00
New Westminster	"	Jno. McMurphy	Aug. 2, 1812	"	Oct. 1, 1884	50 00	12 "	600 00
Vancouver	Public building	Atwell King	April 6, 1843	"	Aug. 25, 1898	50 00	12 "	600 00
Victoria	New Dominion building	Wm. McKay	Dec. 31, 1857	"	Feb. 4, 1898	50 00	12 "	600 00
Victoria	"	A. Johnson	May 12, 1868	Asst. caretaker	April 1, 1899	45 00	12 "	540 00
"	"	J. D. Milne	Oct. 12, 1840	Fireman	Oct. 4, 1899	45 00	8 "	360 00
"	"	J. McMillan	July 8, 1876	Elevatormen	Nov. 27, 1899	45 00	12 "	540 00

JOS. VINCENT.

## Tabular Statement

SHOWING THE DATE OF THE

# Closing and Opening of Navigation

AT THE PRINCIPAL PORTS OF CANADA

ON THE SEABOARD, THE RIVER AND GULF OF ST. LAWRENCE,  
AND ON THE GREAT LAKES

1899-1900

64 VICTORIA, A. 1901

## OPENING AND CLOSING OF NAVIGATION.

STATEMENT showing the date of the closing and opening of navigation at the undermentioned ports of Canada in 1899-1900

Port.	Province.	Location.	Date of closing. 1899-1900.	Date of opening. 1900-1901.	Remarks.
Arichat.	N. S.	Isle Madam	.....	.....	The fall and winter of 1899-1900 was an exception: no ice was formed at this port nor has there been any drift ice from the Strait of Canso which used to block the port in former years.
Bathurst.	N. B.	Baie des Chaleurs	Nov. 28, 1899	May 1, 1900	
Belleville	Ont.	Lake Ontario	Dec. 13, 1899	April 15, "	
Campbellton	N. B.	Baie des Chaleurs	Nov. 28, 1899	May 1, "	
Charlottetown	P. E. I.	Gulf St. Lawrence.	Jan'y 4, 1900	March 17, "	The river is clear below the Government wharf. Ferry steamers running up to 12th January, 1900.
Collingwood	Ont.	Georgian Bay	Dec. 8, 1899	April 16, "	
Gaspé	P. Q.	Gulf St. Lawrence.	Jan'y 3, 1900	May 12, "	A good boat could open harbour in April; and, if necessary, could be kept open all winter.
Georgetown	P. E. I.	Gulf St. Lawrence.	Feb'y 24, 1900	March 21, "	
Goderich	Ont.	Lake Huron	Dec. 20, 1899	April 24, "	
Kincardine	"	"	" 14, 1899	" 21, "	
Kingston	"	Lake Ontario	Jan'y 25, 1900	" 16, "	
Louisbourg	N. S.	Atlantic Ocean	.....	.....	Open all winter Very few days last winter that vessels did not enter or leave port; but last winter was an exceptionally open one.
Montreal	P. Q.	River St. Lawrence	Dec. 30, 1899	April 21, "	
North Rustico	P. E. I.	Gulf St. Lawrence.	" 25, 1899	" 15, "	
North Sydney	N. S.	Atlantic Ocean	.....	.....	Open all winter. The ss. "Bruce" made three trips a week during the winter.
Perce	P. Q.	Gulf St. Lawrence.	Jan'y 1, 1900	April 27, 1900	The ice left the shore on 17th April.
Pictou	N. S.	Gulf St. Lawrence.	" 4, 1900	March 27, "	The winter was very mild. On 3rd April ss. "Princess" arrived from Charlottetown.
Port Arthur	Ont.	Lake Superior	Dec. 16, 1899	April 30, "	The ferry boat "Shewango No. 1" to Conneaut, U.S., is supposed to run all winter. She made 25 trips in January, two in February, and two in March. Port closed for lake craft as above.
Port Dover	"	Lake Erie	" 25, 1899	" 1, "	Navigation in harbour open all winter. Last vessel out (coasting trade) 4th Dec., 1899; last vessel out (seagoing) 30th Nov., 1899. First vessel in (coasting) 6th April, 1900; first in (seagoing) 23rd April, 1900, and first out (coasting) was on 30th March, 1900.
Port Stanley	"	Lake Erie	" 28, 1899	" 1, "	
Quebec	P. Q.	River St. Lawrence	.....	.....	







# OFFICIAL CORRESPONDENCE

DEPARTMENT OF PUBLIC WORKS

*FROM JULY 1st, 1867, to JUNE 30th, 1900*



## OFFICIAL CORRESPONDENCE.

LETTERS Received and Sent from July 1, 1867, to June 30, 1900.

Year.		Received.	Sent.
1867—From	July 1 to December 31.....	2,075	1,511
1868	" January 1 to December 31 .....	3,498	2,317
1869	" " " " .....	3,448	2,171
1870	" " " " .....	4,961	3,185
1871	" " " " .....	6,268	3,983
1872	" " " " .....	8,333	4,428
1873	" " " " .....	10,072	5,707
1874	" " " " .....	9,800	5,043
1875	" " " " .....	9,006	5,006
1876	" " " " .....	7,971	4,773
1877	" " " " .....	7,517	4,425
1878	" " " " .....	6,886	4,021
1879	" " " to October 6.....	7,186	4,547
1879	" October 7 to December 31 .....	2,033	810
1880	" January 1 " " .....	8,451	4,410
1881	" " " " .....	9,599	5,529
1882	" " " " .....	10,505	5,699
1883	" " " " .....	11,633	6,227
1884	" " " " .....	13,114	6,903
1885	" " " " .....	8,977	5,321
1886	" " " " .....	9,644	5,352
1887	" " " to June 30.....	4,866	2,795
1887	" July 1 " 1888.....	10,493	6,343
1888	" " " 1889.....	10,522	7,042
1889	" " " 1890.....	10,008	7,448
1890	" " " 1891.....	10,576	7,286
1891	" " " 1892.....	11,637	6,709
1892	" " " 1893.....	11,720	6,220
1893	" " " 1894.....	9,517	6,028
1894	" " " 1895.....	10,190	5,148
1895	" " " 1896.....	10,223	5,573
1896	" " " 1897.....	11,404	5,033
1897	" " " 1898.....	9,640	5,250
1898	" " " 1899.....	9,639	4,784
1899	" " " 1900.....	12,139	5,938

64 VICTORIA, A. 1901

NUMBER of Cheques sent by Accountant to Secretary's Branch and mailed through the latter, from 1882 to 1900.

Year.		No.
1882	From September 22 to June 30, 1883	1,566
1883	" July 1 " 1884	3,366
1884	" " " 1885	3,298
1885	" " " 1886	3,466
1886	" " " 1887	4,198
1887	" " " 1888	4,692
1888	" " " 1889	4,960
1889	" " " 1890	4,819
1890	" " " 1891	5,376
1891	" " " 1892	5,400
1892	" " " 1893	7,174
1893	" " " 1894	7,792
1894	" " " 1895	8,745
1895	" " " 1896	9,849
1896-7	Records incomplete; partially destroyed by fire, February 11, 1897.	
1897-8	From July 1 to June 30, 1898	10,858
1898-9	" " " 1899	10,495
1899-1900	" " " 1900	12,991

CHEQUES issued by Finance Department and mailed from Secretary's Branch.

Year.		No.
1885	From April 1 to June 30, 1885	245
1885	" July 1 " 1886	954
1886	" " " 1887	1,158
1887	" " " 1888	918
1888	" " " 1889	887
1889	" " " 1890	908
1890	" " " 1891	790
1891	" " " 1892	820
1892	" " " 1893	822
1893	" " " 1894	868
1894	" " " 1895	594
1895	" " " 1896	267
1896-7	Records incomplete; partially destroyed by fire, February 11, 1897.	
1897-8	From July 1 to June 30, 1898	332
1898-9	" " " 1899	213
1899-1900	" " " 1900	1,557

## SESSIONAL PAPER No. 19

LETTERS Received and Sent, Chief Architect's Office, from January 1, 1880, to June 30, 1900.

Year.		Received.	Sent.
1880—From January 1 to June 30.....			1,273
1880	July 1 " 1881.....		2,943
1881	" " " 1882.....		2,859
1882	" " " 1883.....	3,538	4,600
1883	" " " 1884.....	3,860	6,004
1884	" " " 1885.....	4,500	6,718
1885	" " " 1886.....	6,075	6,450
1886	" " " 1887.....	6,816	6,380
1887	" " " 1888.....	6,947	6,870
1888	" " " 1889.....	6,484	7,667
1889	" " " 1890.....	7,448	6,578
1890	" " " 1891.....		7,751
1891	" " " 1892.....	6,113	4,260
1892	" " " 1893.....	7,428	6,453
1893	" " " 1894.....	6,900	*4,517
1894	" " " 1895.....	7,538	15,327
1895	" " " 1896.....	7,843	3,783
1896	" " " 1897.....	10,700	8,200
1897	" " " 1898.....	10,867	8,547
1898	" " " 1899.....	10,913	8,762
1899	" " " 1900.....	12,386	9,878

LETTERS Sent from Chief Engineer's Office, from Jan., 1880 to June, 30, 1900.

Year.	No.
1880..... From January 10, to June 30.....	418
1880..... " July 1, " 1881.....	1,795
1881..... " " " 1882.....	2,352
1882..... " " " 1883.....	2,651
1883..... " " " 1884.....	3,611
1884..... " " " 1885.....	3,119
1885..... " " " 1886.....	2,867
1886..... " " " 1887.....	3,281
1887..... " " " 1888.....	3,552
1888..... " " " 1889.....	4,229
1889..... " " " 1890.....	3,374
1890..... " " " 1891.....	3,948
1891..... " " " 1892.....	4,009
1892..... " " " 1893.....	4,232
1893..... " " " 1894.....	3,966
1894..... " " " 1895.....	4,603
1895..... " " " 1896.....	4,239
1896..... " " " 1897.....	4,994
1897..... " " " 1898.....	4,696
1898..... " " " 1899.....	5,277
1899..... " " " 1900.....	7,396

NOTE.—The letters, including returns, received in the Chief Engineer's Office may be estimated at the rate of two received to one sent.

\* The exact number of letters received cannot be accurately given, but would bear about the same proportion to the letters sent as last year.

† The decrease in the number of letters sent, is due to a change made on January 1, 1894, in the manner of transmitting accounts to the secretary. Previous to that date a letter accompanied each account, but now a bundle of accounts goes with each letter.

T. N. DOODY.





